

# Safety Switches with AS-Interface



**EUCHNER**

More than safety.

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More than safety.



Headquarters in Leinfelden-Echterdingen



Logistics center in Leinfelden-Echterdingen



Production location in Unterböhringen

## Internationally successful – the EUCHNER company

EUCHNER GmbH + Co. KG is a world-leading company in the area of industrial safety technology. EUCHNER has been developing and producing high-quality switching systems for mechanical and systems engineering for more than 60 years.

The medium-sized family-operated company based in Leinfelden, Germany, employs more than 600 people around the world.

15 subsidiaries and other sales partners in Germany and abroad work for our international success on the market.

## Quality and innovation – the EUCHNER products

A look into the past shows EUCHNER to be a company with a great inventive spirit. We take the technological and ecological challenges of the future as an incentive for extraordinary product developments.

EUCHNER safety switches monitor safety doors on machines and installations, help to minimize dangers and risks and thereby reliably protect people and processes. Today, our products range from electromechanical and electronic components to intelligent integrated safety solutions. Safety for people, machines and products is one of our dominant themes.

We define future safety technology with the highest quality standards and reliable technology. Extraordinary solutions ensure the great satisfaction of our customers.

The product ranges are subdivided as follows:

- ▶ Transponder-coded Safety Switches
- ▶ Transponder-coded Safety Switches with guard locking
- ▶ Multifunctional Gate Box MGB
- ▶ Access management systems (Electronic-Key-System EKS)
- ▶ Electromechanical Safety Switches
- ▶ Magnetically coded Safety Switches
- ▶ Enabling Switches
- ▶ Safety Relays
- ▶ Emergency Stop Devices
- ▶ Hand-Held Pendant Stations and Handwheels
- ▶ Safety Switches with AS-Interface
- ▶ Joystick Switches
- ▶ Position Switches



## Safety switches with AS-Interface

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## Bus systems in safety systems

Bus systems are also used for wiring safety products. The AS-Interface bus is recognized by accredited certification bodies. A consortium comprising various international companies was established to develop the safety-relevant part of the bus protocol.

EUCHNER is actively involved in the development and production process in this organization. With the AS-Interface Safety at Work, a monitor is employed as an additional bus subscriber to monitor the protocol. This protocol is embedded in the AS-Interface protocol, and its purpose is to guarantee safety on the bus. With Safety at Work, the monitor also assumes the link functions realized using safety relays and terminals when parallel wiring is used in the control cabinet. The monitor is thus ultimately a programmable small safety control system. The bus technology thus considerably reduces the amount of wiring, not only in the field, but especially in the control cabinet as well.

## AS-Interface Safety at Work in safety systems

AS-Interface is a low-level bus system that is used for the transfer of small data volumes. It is particularly suitable where digital signals are required in the field. However, analog signals can also be processed. Thanks to its simple structure, AS-Interface does not require any programming. For most bus subscribers, it is only necessary to set the address of the bus subscriber. No special knowledge of the bus is required.

Any safety component can be connected to the bus. The monitor is designed so that these components can be connected irrespective of their manufacturer. Device compatibility is guaranteed at all times. When connecting an AS-Interface Safety at Work device, it is important not only to ensure compatibility with the bus, but also to facilitate compliance with the Machinery Directive. AS-Interface certification ensures that the bus subscribers also comply with the standards that apply to the bus. Certification by the stated bodies ensures that all safety components are in compliance with the Machinery Directive.

The ASiMon software is used to implement the links in the monitor. All settings for the safety components are thus made in the monitor. Setup diagnostics can be selected and the logical component links can be implemented. The monitor thus represents the core of the entire safety system. It replaces both the wiring and the safety relays.

The simple construction of a bus system practically eliminates the possibility of errors in the wiring. The bus and monitor diagnostic functions also facilitate rapid error detection. Consequently, setup can be performed directly after the planning phase and the preparation of the monitor configuration. The bus subscribers then simply have to be connected.

The extremely effective bus diagnostic function is also useful during operation. Should an error occur during operation, all situations can be detected and displayed in the control system. Most EUCHNER safety switches have freely programmable LEDs that can be used for an effective diagnostic function. Any system standstills can thus be dealt with quickly.

## Operation of AS-Interface Safety at Work

Replacing faulty components is very easy with AS-Interface Safety at Work. A bus subscriber that needs to be replaced only has to be substituted with a device with its address set to 0. The bus starts this device automatically when a button is pressed. This exchange thus progresses very rapidly and without the use of a programming device. It is even possible to replace the monitor with a new device without the use of a computer. In this case, a new device and a "push of a button" are all that is needed to get the system up and running again.

Because of the many advantages of AS-Interface Safety at Work and the large selection of different safety components, this system is also ideal as an autarchic safety system within an installation that uses a higher-level fieldbus. If the diagnostic function is required in this case, it can easily be incorporated in the higher-level bus by means of an integrated gateway.

EUCHNER safety switches maximize all of the features that the bus has to offer. Switches with guard locking do more than just signal the position of the movable safety guards to the control system. They also distinguish and signal the position of the guard locking compared with the position of the door. Complete visualization of the safety guard is thus possible. EUCHNER provides full diagnostic functionality for the most common control systems.

With EUCHNER switches, the guard locking is controlled using the bus. Because of the separate supply cable for the auxiliary power, the guard locking can also be activated as a safe channel. Many switches have LEDs integrated on the front; these LEDs can be controlled using the bus. On-site diagnosis can therefore be performed with the control system without the need for additional wiring.

## Minimization of the costs for hardware

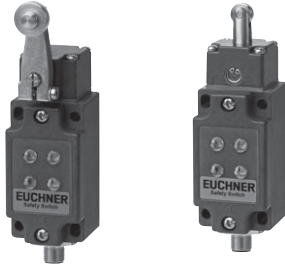
Instead of a separate monitor, EUCHNER also offers devices on which the monitor is directly integrated in the gateway. As a result the costs for hardware are reduced and the functionality increased at the same time. On the integrated gateway with monitor GMOx two complete AS-i buses can be connected; in the application these buses act like a single larger AS-i bus.

In addition, the number of safe outputs increases to up to 16 per device used. On the GMOx devices, safe distributed outputs SOM can be used on the AS-i bus. These outputs have relay contacts for shut down, but can also read inputs at the same time. Control and also diagnostics in this case are via the GMOx. In addition the output SOM can be controlled by the machine control system during operation. This feature of course only works if the GMOx also provides an enable.

## Position switch NZ with integrated actuator



- ▶ Version A according to EN 50041 NZ.HS (steel roller  $\varnothing$  18)
- ▶ Version C according to EN 50041 NZ.RS (steel roller  $\varnothing$  12 mm)



### Approach direction Version A according to EN 50041 NZ.HS/ NZ.HB



Horizontal  
Switch head and lever arm can be adjusted in 90° steps.

### Switching direction Right, left or both sides.

### Version C according to EN 50041 NZ.RS



Horizontal  
Adjustable in 90° steps.

### AS-Interface inputs

- ▶ **D0, D1** Positively driven NC contact 1
  - ▶ **D2, D3** Positively driven NC contact 2
- Evaluation is performed via a safety monitor.

### AS-Interface outputs

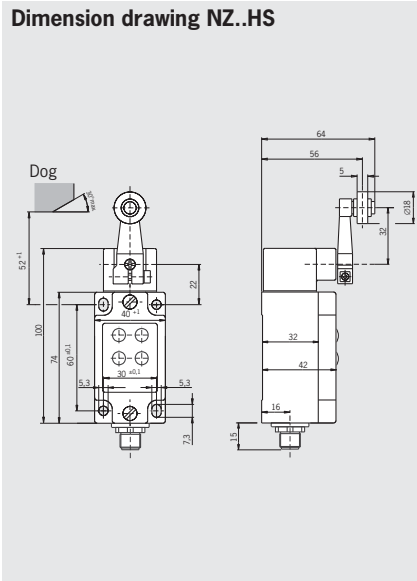
- ▶ **D1** Red LED
- ▶ **D2** Green LED

### LED function display

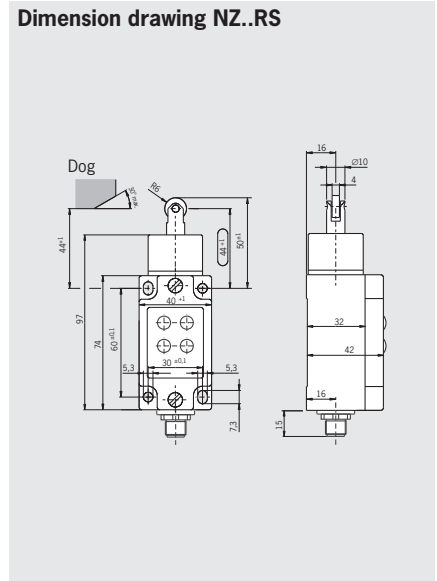
- ▶ The *Power* LED indicates the operating voltage on the bus.
- ▶ The *Fault* LED indicates if a fault has been detected on the AS-Interface bus.
- ▶ The green and the red LEDs can be controlled as required by the control system via the bus using bits D1 and D2.

### Plug connector M12 4-pin

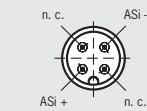
#### Dimension drawing NZ..HS



#### Dimension drawing NZ..RS



### Connector assignment



View of connection side

For trip rails and trip dogs, see the catalog "Multiple limit switches"

### Ordering table

Series	Connection	Actuator	Switching element	Order No./item
NZ	SEM 4 Plug connector M12	HS Lever arm Steel roller $\varnothing$ 18	2 NC $\rightarrow$	<b>095201</b> NZ2HS-538SEM4AS1
		RS Roller plunger Steel roller $\varnothing$ 12	2 NC $\rightarrow$	<b>095046</b> NZ2RS-538SEM4AS1

## Safety switch NZ.VZ

- ▶ Housing according to EN 50041



### Approach direction

- ▶ Horizontal
- ▶ Adjustable in 90° steps.

### AS-Interface inputs

- ▶ **D0, D1** Positively driven NC contact 1
  - ▶ **D2, D3** Positively driven NC contact 2
- Evaluation is performed via a safety monitor.

### AS-Interface outputs

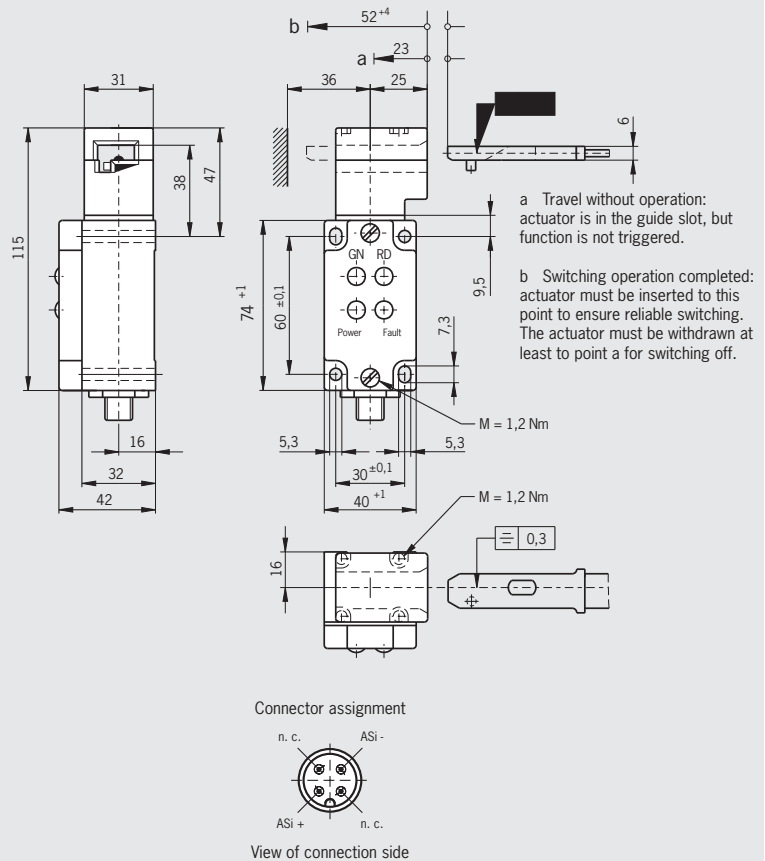
- ▶ **D1** Red LED
- ▶ **D2** Green LED

### LED function display

- ▶ The *Power* LED indicates the operating voltage on the bus.
- ▶ The *Fault* LED indicates if a fault has been detected on the AS-Interface bus.
- ▶ The green and the red LEDs can be controlled as required by the control system via the bus using bits D1 and D2.

## Plug connector M12 4-pin

### Dimension drawing



Please order actuator separately (see catalog "Safety switches with metal housing")

### Ordering table

Series	Connection	Actuator	Switching element	Order No./item
NZ	SEM 4 Plug connector M12	VZ Separate actuator	2 NC ⊖	<b>090742</b> NZ2VZ-538ESEM4-AS1

## Safety switch TZ with guard locking and guard lock monitoring



- ▶ Auxiliary release on the front
- ▶ Actuator head fitted left or right



### Auxiliary release

Is used for releasing the guard locking with the aid of a tool. A sealing wire and auxiliary tool are fitted to protect against tampering.

### Guard locking types

**TZ1** Closed-circuit current principle, guard locking by spring force. Release by control of AS-i output O.

**TZ2** Open-circuit current principle, guard locking by control of AS-i output O. Release by spring force.

### Control of the guard locking solenoid

The guard locking solenoid is controlled by the control system via AS-Interface bus bit D0. In addition the 24V connection can be switched safely.

### AS-Interface inputs

- ▶ **D0, D1** Door monitoring contact SK
  - ▶ **D2, D3** Solenoid monitoring contact ÜK
- Evaluation is performed via a safety monitor.

### AS-Interface outputs

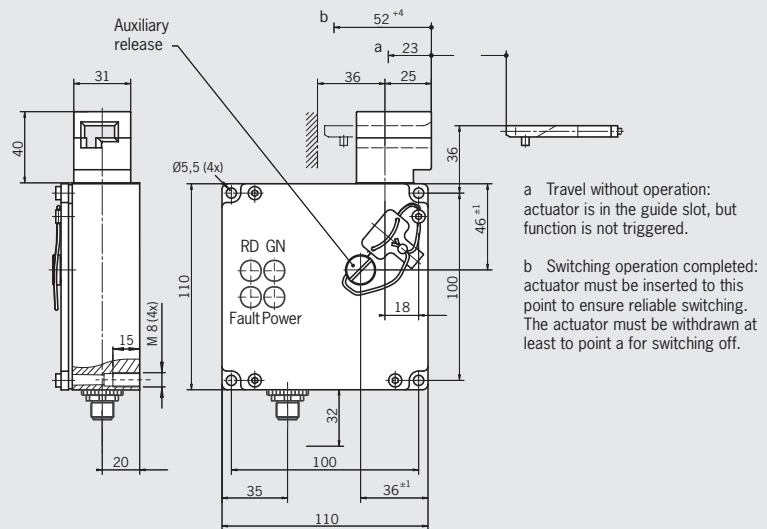
- ▶ **D0** Guard locking solenoid
- ▶ **D1** Red LED
- ▶ **D2** Green LED

### LED function display

- ▶ The *Power* LED indicates the operating voltage on the bus.
- ▶ The *Fault* LED indicates if a fault has been detected on the AS-Interface bus.
- ▶ The green and the red LEDs can be controlled as required by the control system via the bus using bits D1 and D2.

**Plug connector M12**  
4-pin

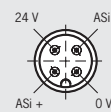
**Dimension drawings** actuator head on the left is a mirror image



a Travel without operation: actuator is in the guide slot, but function is not triggered.

b Switching operation completed: actuator must be inserted to this point to ensure reliable switching. The actuator must be withdrawn at least to point a for switching off.

Connector assignment



View of connection side

Please order actuator separately (see catalog "Safety switches with metal housing")

### Ordering table

Series	Connection	Guard locking device	Switch head	Switching element	Order No./item
TZ	SEM 4 Plug connector M12	1 Mechanical	LE Left	SK: 1 NC ⊖ ÜK: 1 NC ⊖	<b>086140</b> TZ1LE024SEM4AS1
			RE Right	SK: 1 NC ⊖ ÜK: 1 NC ⊖	<b>086141</b> TZ1RE024SEM4AS1
		2 Electrical	LE Left	SK: 1 NC ⊖ ÜK: 1 NC ⊖	<b>086990</b> TZ2LE024SEM4AS1
			RE Right	SK: 1 NC ⊖ ÜK: 1 NC ⊖	<b>086991</b> TZ2RE024SEM4AS1



## Safety switch TZ with guard locking and guard lock monitoring



- ▶ Auxiliary release on the front
- ▶ Escape release on the rear with key button
- ▶ Actuator head fitted left or right



### Auxiliary release

Is used for releasing the guard locking with the aid of a tool. A sealing wire and auxiliary tool are fitted to protect against tampering.

### Escape release

This is used for manual release of guard locking from within the danger area without tools. The disable can only be removed and the switch returned to its operating state using a key included.

### Guard locking type

**TZ1** Closed-circuit current principle, guard locking by spring force. Release by control of AS-i output 0.

### Control of the guard locking solenoid

The guard locking solenoid is controlled by the control system via AS-Interface bus bit D0. In addition the 24V connection can be switched safely.

### AS-Interface inputs

- ▶ **D0, D1** Door monitoring contact SK
  - ▶ **D2, D3** Solenoid monitoring contact ÜK
- Evaluation is performed via a safety monitor.

### AS-Interface outputs

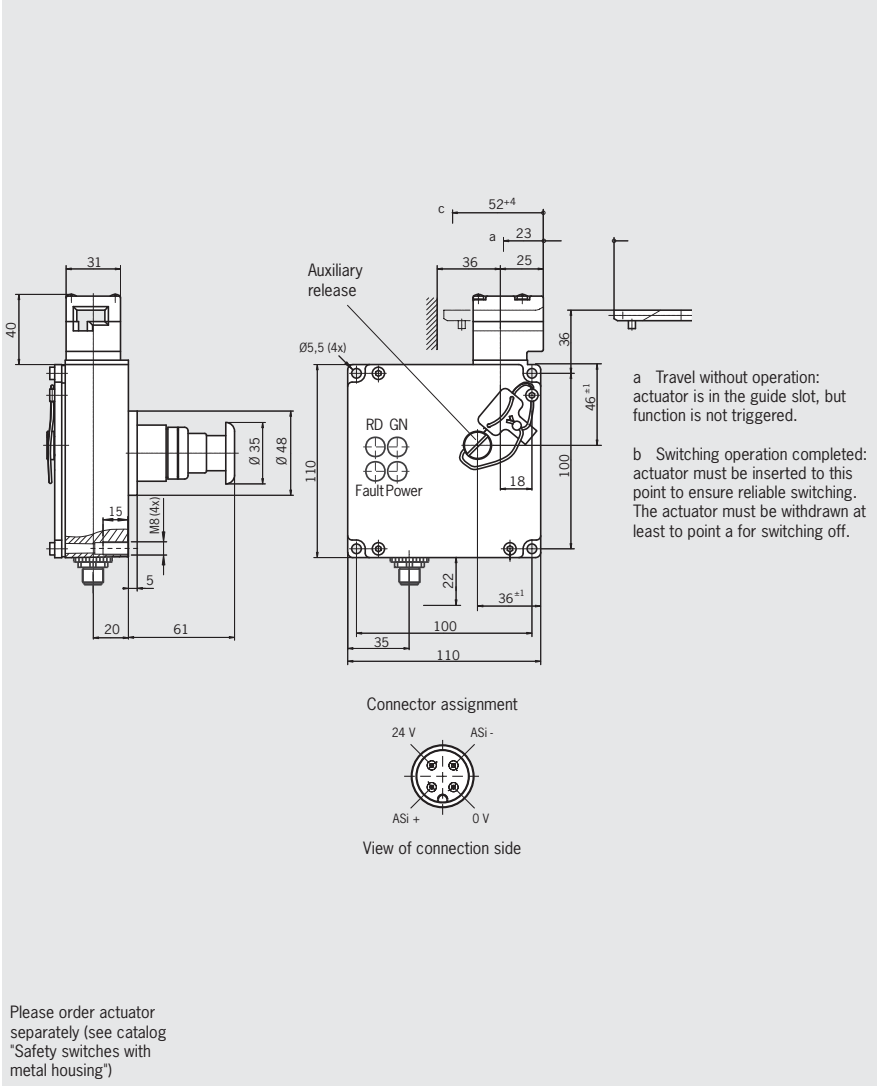
- ▶ **D0** Guard locking solenoid
- ▶ **D1** Red LED
- ▶ **D2** Green LED

### LED function display

- ▶ The Power LED indicates the operating voltage on the bus.
- ▶ The Fault LED indicates if a fault has been detected on the AS-Interface bus.
- ▶ The green and the red LEDs can be controlled as required by the control system via the bus using bits D1 and D2.

**Plug connector M12**  
4-pin

**Dimension drawings** actuator head on the left is a mirror image



### Ordering table

Series	Connection	Guard locking device	Switch head	Switching element	Version	Order No./item
TZ	SEM 4 Plug connector M12	1 Mechanical	LE Left	SK: 1 NC ⊕ ÜK: 1 NC ⊕	<b>C1815</b> Escape release (red key button)	<b>094422</b> TZ1LE024SEM4AS1-C1815
			RE Right	SK: 1 NC ⊕ ÜK: 1 NC ⊕	<b>C1815</b> Escape release (red key button)	<b>094423</b> TZ1RE024SEM4AS1-C1815



## Safety switch TZ with guard locking and guard lock monitoring



- ▶ Emergency unlocking on the front with rotary knob
- ▶ Actuator head fitted left or right

**Plug connector M12**  
4-pin



### Emergency unlocking

Is used for the manual release of the guard locking without tools. The emergency unlocking mechanism must be returned to the locked state manually. A sealing wire is fitted to protect against tampering.

### Guard locking type

**TZ1** Closed-circuit current principle, guard locking by spring force. Release by control of AS-i output O.

### Control of the guard locking solenoid

The guard locking solenoid is controlled by the control system via AS-Interface bus bit D0. In addition the 24V connection can be switched safely.

### AS-Interface inputs

- ▶ **D0, D1** Door monitoring contact SK
  - ▶ **D2, D3** Solenoid monitoring contact ÜK
- Evaluation is performed via a safety monitor.

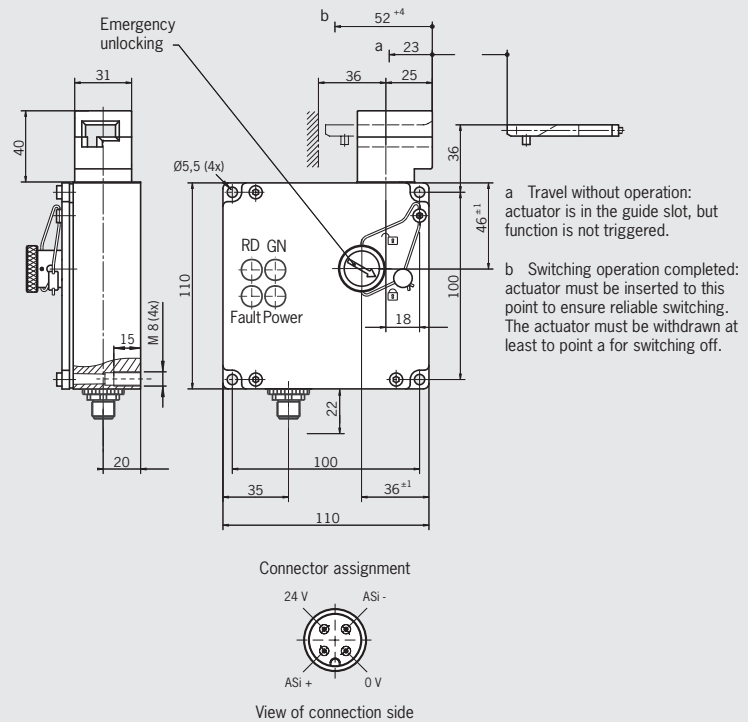
### AS-Interface outputs

- ▶ **D0** Guard locking solenoid
- ▶ **D1** Red LED
- ▶ **D2** Green LED

### LED function display

- ▶ The *Power* LED indicates the operating voltage on the bus.
- ▶ The *Fault* LED indicates if a fault has been detected on the AS-Interface bus.
- ▶ The green and the red LEDs can be controlled as required by the control system via the bus using bits D1 and D2.

### Dimension drawings actuator head on the left is a mirror image



Please order actuator separately (see catalog "Safety switches with metal housing")

### Ordering table

Series	Connection	Guard locking device	Switch head	Switching element	Version	Order No./item
TZ	SEM 4 Plug connector M12	1 Mechanical	LE Left	SK: 1 NC ⊕ ÜK: 1 NC ⊕	<b>C1937</b> Emergency unlocking	<b>090278</b> TZ1LE024SEM4AS1-C1937
			RE Right	SK: 1 NC ⊕ ÜK: 1 NC ⊕	<b>C1937</b> Emergency unlocking	<b>090279</b> TZ1RE024SEM4AS1-C1937

## Safety switch NX

- ▶ LED function display



### Approach direction



Horizontal and vertical  
Adjustable in 90° steps.

### AS-Interface inputs

- ▶ **D0, D1** Positively driven NC contact 1
  - ▶ **D2, D3** Positively driven NC contact 2
- Evaluation is performed via a safety monitor.

### AS-Interface outputs

- ▶ **D1** Red LED
- ▶ **D2** Green LED

### Internal LED function display

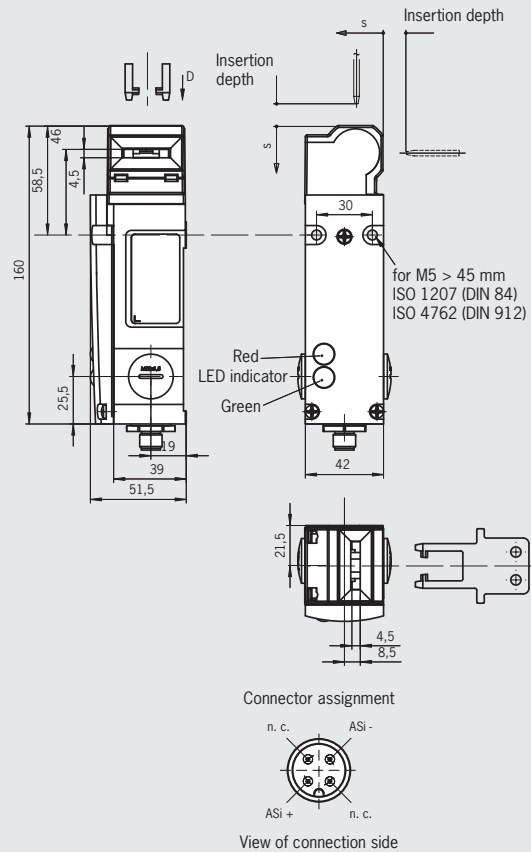
- ▶ The *Power* LED indicates the operating voltage on the bus.
- ▶ The *Fault* LED indicates if a fault has been detected on the AS-Interface bus.

### External LED function display

- ▶ The green and the red LEDs can be controlled as required by the control system via the bus using bits D1 and D2.

## Plug connector M12 4-pin

### Dimension drawing



Please order actuator separately (see catalog "Safety switches with metal housing")

### Ordering table

Series	Connection	Switching element	Order No./item
NX	SEM 4 Plug connector M12	2 NC ⇄	<b>094362</b> NX1-2131ASEM4-AS1

## Safety switch TX with guard locking and guard lock monitoring



- ▶ Auxiliary release on the front
- ▶ Escape release on the rear optional



### Approach direction

Horizontal  
Adjustable in 90° steps.

### Auxiliary release

Is used for releasing the guard locking with the aid of a tool. To protect against tampering, the auxiliary release is sealed with sealing lacquer.

### Escape release

This is used for manual release of guard locking from within the danger area without tools. With identification of On/Off position.

### Guard locking type

**TX1** Closed-circuit current principle, guard locking by spring force. Release by control of AS-i output 0.

### Control of the guard locking solenoid

The guard locking solenoid is controlled by the control system via AS-Interface bus bit D0. In addition the 24V connection can be switched safely.

### AS-Interface inputs

- ▶ **D0, D1** Positively driven NC contact 1 (safety door monitoring)
- ▶ **D2, D3** Positively driven NC contact 2 (guard lock monitoring)

Evaluation is performed via a safety monitor.

### AS-Interface outputs

- ▶ **D1** Red LED
- ▶ **D2** Green LED

### Internal LED function display

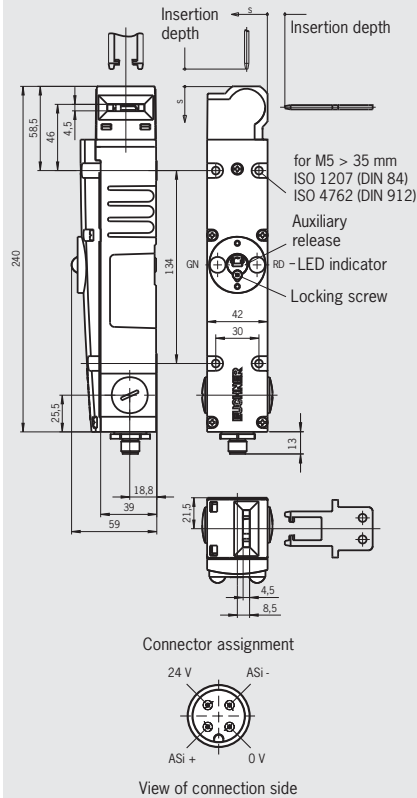
- ▶ The *Power* LED indicates the operating voltage on the bus.
- ▶ The *Fault* LED indicates if a fault has been detected on the AS-Interface bus.

### External LED function display

- ▶ The green and the red LEDs can be controlled as required by the control system via the bus using bits D1 and D2.

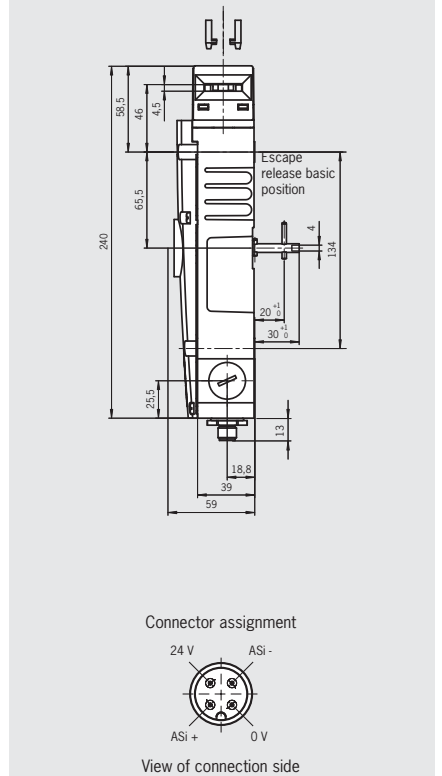
### Without escape release Plug connector M12, 4-pin

#### Dimension drawing



Please order actuator separately (see catalog "Safety switches with metal housing")

### With escape release Plug connector M12, 4-pin



Please order actuator separately (see catalog "Safety switches with metal housing")

### Ordering table

Series	Connection	Guard locking device	Switching element	Version	Order No./item
TX	SEM 4 Plug connector M12	1 Mechanical	SK: 1 NC → UK: 1 NC →		<b>094403</b> TX1B-A024SEM4AS1
				<b>C1991</b> with escape release	<b>095914</b> TX1B-A024SEM4AS1C1991

## Safety switch STA with guard locking and guard lock monitoring



- ▶ Auxiliary release on the front



### Auxiliary release

Is used for releasing the guard locking with the aid of a tool. To protect against tampering, the auxiliary release is sealed with sealing lacquer.

### Guard locking type

**STA3** Closed-circuit current principle, guard locking by spring force. Release by control of AS-i output 0.

**STA4** Open-circuit current principle, guard locking by control of AS-i output 0. Release by spring force.

### Control of the guard locking solenoid

The guard locking solenoid is controlled by the control system via AS-Interface bus bit D0. In addition the 24V connection can be switched safely.

### AS-Interface inputs

- ▶ **D0, D1** Door monitoring contact SK
  - ▶ **D2, D3** Solenoid monitoring contact ÜK
- Evaluation is performed via a safety monitor.

### AS-Interface outputs

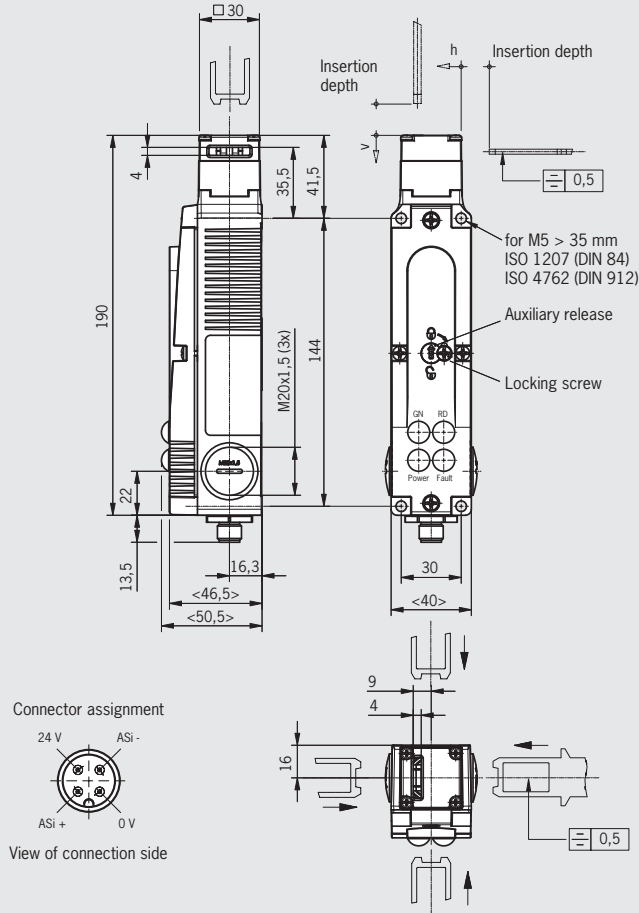
- ▶ **D0** Guard locking solenoid
- ▶ **D1** Red LED
- ▶ **D2** Green LED

### LED function display

- ▶ The *Power* LED indicates the operating voltage on the bus.
- ▶ The *Fault* LED indicates if a fault has been detected on the AS-Interface bus.
- ▶ The green and the red LEDs can be controlled as required by the control system via the bus using bits D1 and D2.

**Plug connector M12**  
4-pin

### Dimension drawing



Please order actuator separately  
(see catalog "Safety switches with metal housing"  
or catalog "Safety switches with plastic housing")

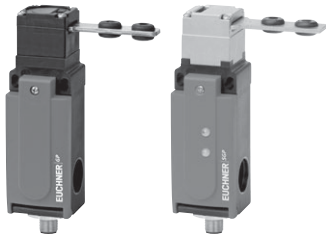
### Ordering table

Series	Connection	Guard locking device	Switching element	Order No./item
STA	SEM 4 Plug connector M12	3 Mechanical	SK: 1 NC ⊕ ÜK: 1 NC ⊕	<b>098993</b> STA3A-4141A024SEM4AS1
		4 Electrical	SK: 1 NC ⊕ ÜK: 1 NC ⊕	<b>105305</b> STA4A-4141A024SEM4AS1



## Safety switches GP and SGP

- ▶ For metal SGP actuating head
- ▶ External LED function display optional



### Approach direction



Can be adjusted horizontally and vertically in 90° steps.

### AS-Interface inputs

- ▶ **D0, D1** Positively driven NC contact 1
  - ▶ **D2, D3** Positively driven NC contact 2
- Evaluation is performed via a safety monitor.

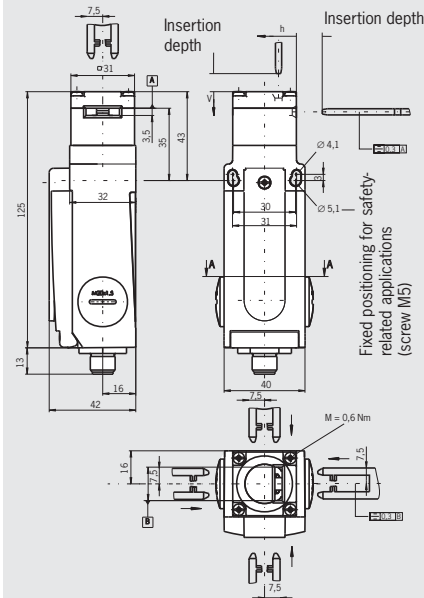
### LED function display

(Depending on version internal with open cover or external)

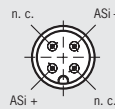
- ▶ The *Power* LED indicates the operating voltage on the bus.
- ▶ The *Fault* LED indicates if a fault has been detected on the AS-Interface bus.

## GP, plug connector M12 4-pin

### Dimension drawing



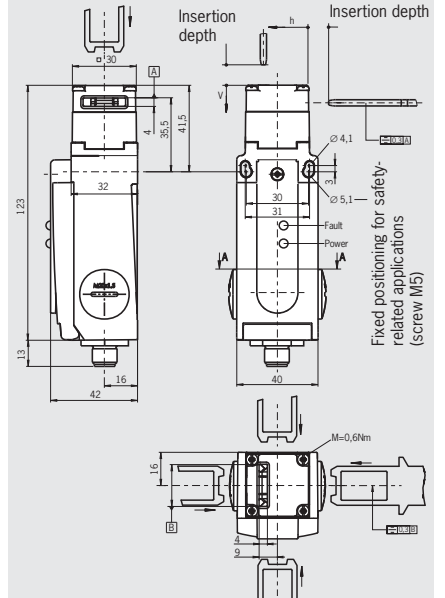
### Connector assignment



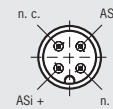
View of connection side

Please order actuator separately (see catalog "Safety switches with plastic housing")

## SGP, plug connector M12 4-pin



### Connector assignment



View of connection side

Please order actuator separately (see catalog "Safety switches with plastic housing")

## Ordering table

Series	Connection	Switching element	LED function display	Order No./item
GP	SEM 4 Plug connector M12	2 NC ⊖	internal	<b>091193</b> GP3-538ASEM4AS1
			external	<b>106352</b> SGP3E-538ASEM4AS1L
SGP	SEM 4 Plug connector M12	2 NC ⊖	internal	<b>099126</b> SGP3E-538ASEM4AS1
			external	<b>106352</b> SGP3E-538ASEM4AS1L



## Safety switch TP with guard locking

- ▶ Auxiliary release on the front
- ▶ Increased horizontal overtravel
- ▶ Optional without guard lock monitoring



### Auxiliary release

Is used for releasing the guard locking with the aid of a tool. To protect against tampering, the auxiliary release is sealed with sealing lacquer.

### Guard locking types

**TP3** Closed-circuit current principle, guard locking by spring force. Release by control of AS-i output 0.

**TP4** Open-circuit current principle, guard locking by control of AS-i output 0. Release by spring force.

### Control of the guard locking solenoid

The guard locking solenoid is controlled by the control system via AS-Interface bus bit D0. In addition the 24V connection can be switched safely.

### AS-Interface inputs version AS1

- ▶ **D0, D1** Door monitoring contact SK
- ▶ **D2, D3** Solenoid monitoring contact ÜK

### AS-Interface inputs version AS2

- ▶ **D0, D1** Door monitoring contact SK 1
- ▶ **D2, D3** Door monitoring contact SK 2

Evaluation is performed via a safety monitor.

### AS-Interface outputs

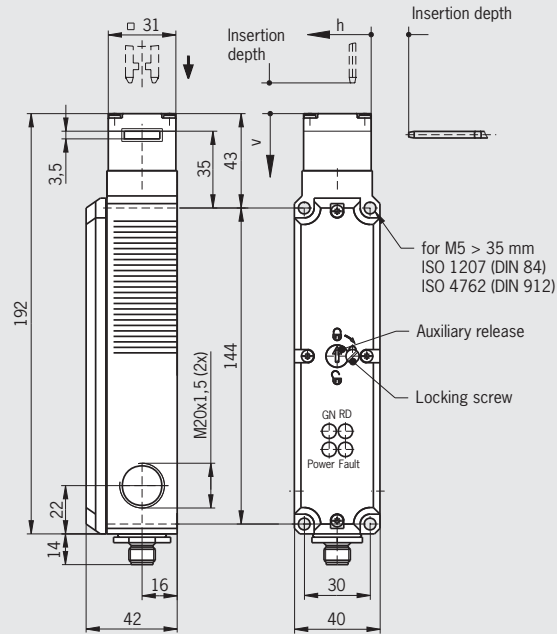
- ▶ **D0** Guard locking solenoid
- ▶ **D1** Red LED
- ▶ **D2** Green LED

### LED function display

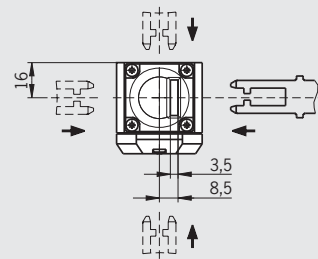
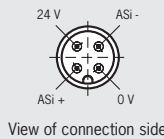
- ▶ The *Power* LED indicates the operating voltage on the bus.
- ▶ The *Fault* LED indicates if a fault has been detected on the AS-Interface bus.
- ▶ The green and the red LEDs can be controlled as required by the control system via the bus using bits D1 and D2.

**Plug connector M12**  
4-pin

### Dimension drawing



### Connector assignment



Please order actuator separately (see catalog "Safety switches with plastic housing")

### Ordering table

Series	Connection	Guard locking device	Switching element	Version	Order No./item
TP	SEM 4 Plug connector M12	3 Mechanical	SK: 1 NC ⊖ ÜK: 1 NC ⊖	AS1 With guard lock monitoring	<b>088256</b> TP3-4141A024SEM4AS1
		4 Electrical	SK: 1 NC ⊖ ÜK: 1 NC ⊖	AS1 With guard lock monitoring	<b>088257</b> TP4-4141A024SEM4AS1
			SK: 2 NC ⊖	AS2 Without guard lock monitoring	<b>091676</b> TP4-4141A024SEM4AS2



## Safety switch STP with guard locking and guard lock monitoring

- ▶ Actuating head made of metal
- ▶ Auxiliary release on the front



### Auxiliary release

Is used for releasing the guard locking with the aid of a tool. To protect against tampering, the auxiliary release is sealed with sealing lacquer.

### Guard locking types

**STP3** Closed-circuit current principle, guard locking by spring force. Release by control of AS-i output O.

**STP4** Open-circuit current principle, guard locking by control of AS-i output O. Release by spring force.

### Control of the guard locking solenoid

The guard locking solenoid is controlled by the control system via AS-Interface bus bit D0. In addition the 24V connection can be switched safely.

### AS-Interface inputs

- ▶ **D0, D1** Door monitoring contact SK
  - ▶ **D2, D3** Solenoid monitoring contact ÜK
- Evaluation is performed via a safety monitor.

### AS-Interface outputs

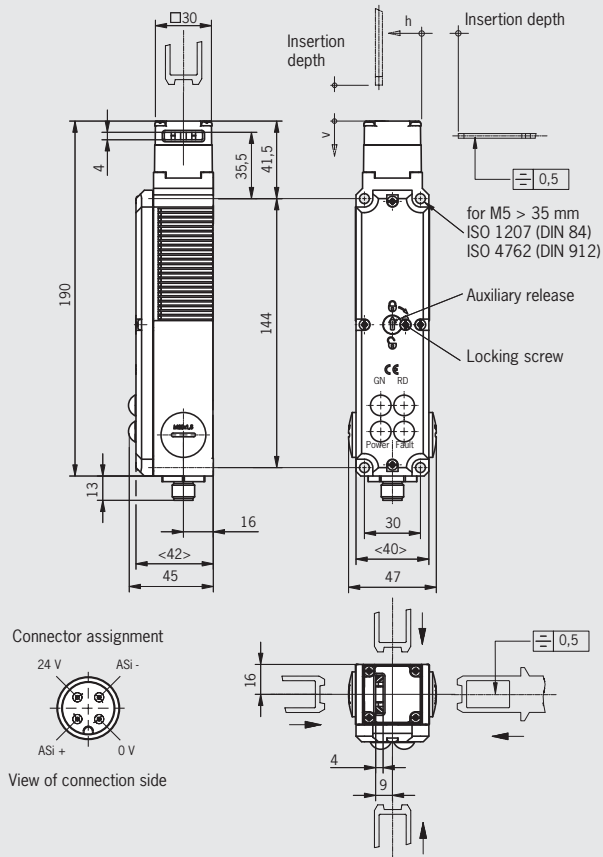
- ▶ **D0** Guard locking solenoid
- ▶ **D1** Red LED
- ▶ **D2** Green LED

### LED function display

- ▶ The *Power* LED indicates the operating voltage on the bus.
- ▶ The *Fault* LED indicates if a fault has been detected on the AS-Interface bus.
- ▶ The green and the red LEDs can be controlled as required by the control system via the bus using bits D1 and D2.

**Plug connector M12**  
4-pin

### Dimension drawing



Please order actuator separately (see catalog "Safety switches with plastic housing")

### Ordering table

Series	Connection	Guard locking device	Switching element	Order No./item
STP	SEM 4 Plug connector M12	3 Mechanical	SK: 1 NC ⊖ ÜK: 1 NC ⊖	<b>097790</b> STP3A-4141A024SEM4AS1
		4 Electrical	SK: 1 NC ⊖ ÜK: 1 NC ⊖	<b>097789</b> STP4A-4141A024SEM4AS1



## Safety switch STP with guard locking and guard lock monitoring



- ▶ Power supply for the guard locking solenoid from AS-i bus
- ▶ Actuating head made of metal
- ▶ Auxiliary release on the front
- ▶ According to AS-Interface specification 3.1



### Auxiliary release

Is used for releasing the guard locking with the aid of a tool. To protect against tampering, the auxiliary release is sealed with sealing lacquer.

### Guard locking types

**STP3** Closed-circuit current principle, guard locking by spring force. Release by control of AS-i output 0.

**STP4** Open-circuit current principle, guard locking by control of AS-i output 0. Release by spring force.

### Control of the guard locking solenoid

The guard locking solenoid is controlled by the control system via AS-Interface bus bit D0. It is only supplied from the AS-i bus, an additional supply of auxiliary power is not necessary. The current consumption with solenoid switched on is 400 mA.

### AS-Interface inputs

- ▶ **D0, D1** Door monitoring contact SK
  - ▶ **D2, D3** Solenoid monitoring contact ÜK
- Evaluation is performed via a safety monitor.

### AS-Interface outputs

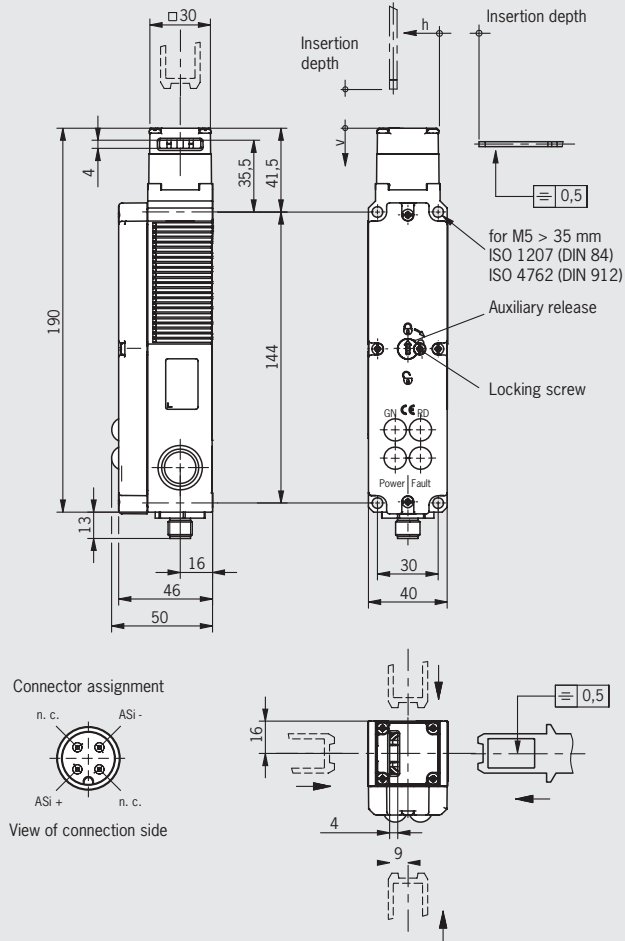
- ▶ **D0** Guard locking solenoid
- ▶ **D1** Red LED
- ▶ **D2** Green LED

### LED function display

- ▶ The Power LED indicates the operating voltage on the bus.
- ▶ The Fault LED indicates if a fault has been detected on the AS-Interface bus.
- ▶ The green and the red LEDs can be controlled as required by the control system via the bus using bits D1 and D2.

**Plug connector M12**  
4-pin

### Dimension drawing



Please order actuator separately (see catalog "Safety switches with plastic housing")

### Ordering table

Series	Connection	Guard locking device	Switching element	Order No./item
STP	SEM 4 Plug connector M12	3 Mechanical	SK: 1 NC ⊕ ÜK: 1 NC ⊕	<b>106648</b> STP3A-4141A024SEM4AS3
		4 Electrical	SK: 1 NC ⊕ ÜK: 1 NC ⊕	<b>106649</b> STP4A-4141A024SEM4AS3



## Safety switch STP-TW with guard locking and guard lock monitoring

- ▶ Actuating heads made of metal
- ▶ Auxiliary release on the front
- ▶ Auxiliary key release optional



### Function

In the safe state, both actuators must be inserted into the switch head.

### Auxiliary release

Is used for releasing the guard locking with the aid of a tool. To protect against tampering, the auxiliary release is sealed with sealing lacquer.

### Guard locking types

**STP-TW3** Closed-circuit current principle, guard locking by spring force. Release by control of AS-i output 0.

### Control of the guard locking solenoid

The guard locking solenoid is controlled by the control system via AS-Interface bus bit D0. In addition the 24V connection can be switched safely.

### AS-Interface inputs

- ▶ **D0, D1** Door monitoring contact SK
  - ▶ **D2, D3** Solenoid monitoring contact ÜK
- Evaluation is performed via a safety monitor.

### AS-Interface outputs

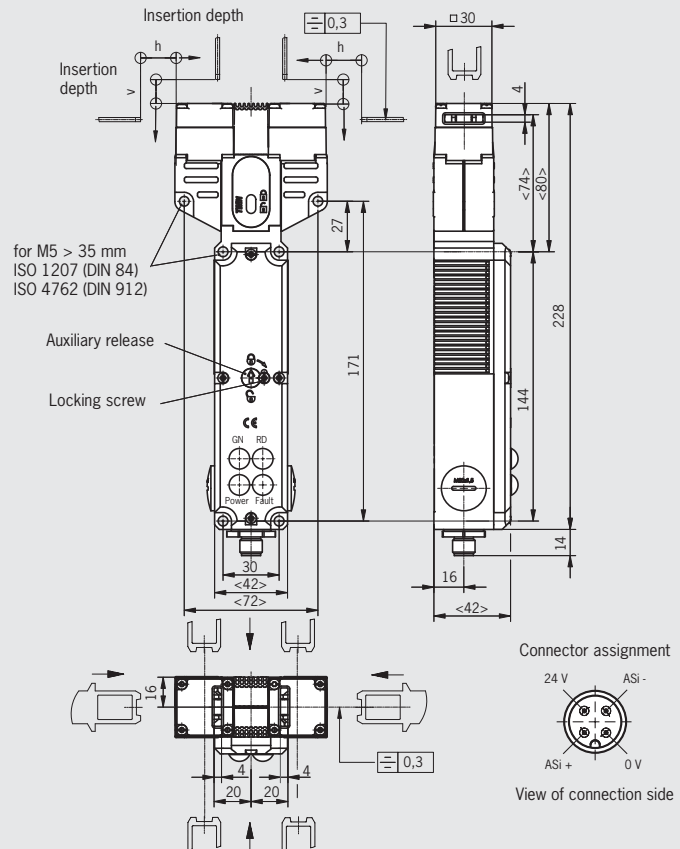
- ▶ **D0** Guard locking solenoid
- ▶ **D1** Red LED
- ▶ **D2** Green LED

### LED function display

- ▶ The *Power* LED indicates the operating voltage on the bus.
- ▶ The *Fault* LED indicates if a fault has been detected on the AS-Interface bus.
- ▶ The green and the red LEDs can be controlled as required by the control system via the bus using bits D1 and D2.

**Plug connector M12**  
4-pin

### Dimension drawing



Please order actuator separately (see catalog "Safety switches with plastic housing")

### Ordering table

Series	Connection	Guard locking device	Switching element	Order No./item
STP-TW	SEM 4 Plug connector M12	3 Mechanical	SK: 1 NC ⊕ ÜK: 1 NC ⊕	<b>102354</b> STP-TW-3A-4141AC024SEM4AS1
		4 Electrical	SK: 1 NC ⊕ ÜK: 1 NC ⊕	<b>109813</b> STP-TW-4A-4141AC024SEM4AS1

## Enabling switches ZSA and ZSB



- ▶ Housing G1
- ▶ 3-stage function
- ▶ Positively driven contacts
- ▶ Dual-channel version
- ▶ Optional with 2 buttons (+ and -)



### 3-stage function

Enabling function is only active in the second stage (middle position, actuating point). Enabling is canceled when the button is released or pushed all the way down (panic function).

### + and - buttons

These buttons can be configured individually. For example, for moving axes in positive or negative direction.

### AS-Interface inputs

- ▶ **D0, D1** NO contact E1
- ▶ **D2, D3** NO contact E2

Evaluation is performed via a safety monitor.

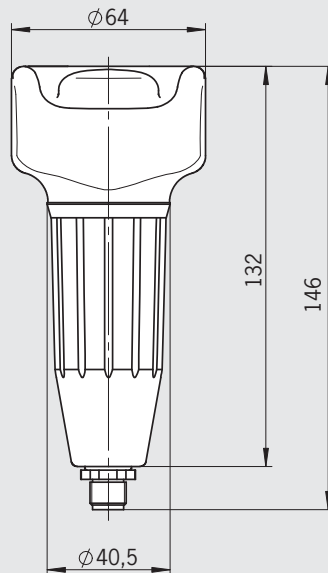
### AS-Interface parameters

The buttons (+ and -) are transferred when the AS-i parameters are read out.

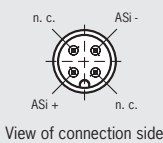
- ▶ **P0** Parameter bit, Plus button
- ▶ **P1** Parameter bit, Minus button

### ZSA, 3-stage function Plug connector M12, 4-pin

#### Dimension drawings

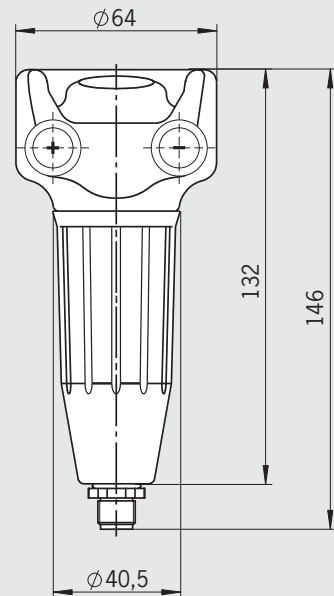


Connector assignment

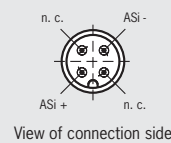


See catalog "Enabling switches" for accessories

### ZSB, 3-stage function Plug connector M12, 4-pin

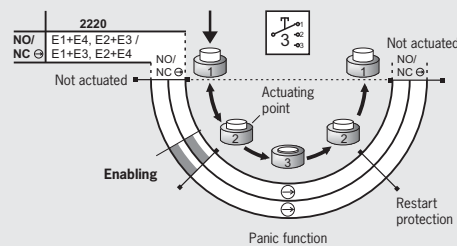


Connector assignment



See catalog "Enabling switches" for accessories

### Function sequence



**Contact**  
 open  
 closed  
 closed, enabling

### Ordering table

Series	Connection	Switching element	Switching element	Order No./item
G1 3-stage	SEM 4 Plug connector M12	2 NO three-stage		<b>091580</b> ZSA2B2CAS1
			2 buttons (+ and -)	<b>096703</b> ZSB2B7CAS1

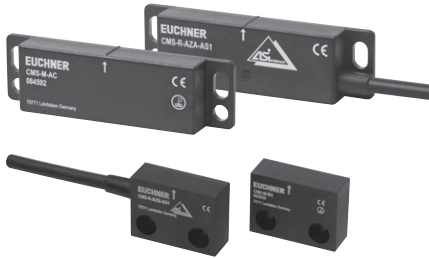
## Non-contact safety switch CMS...AS1



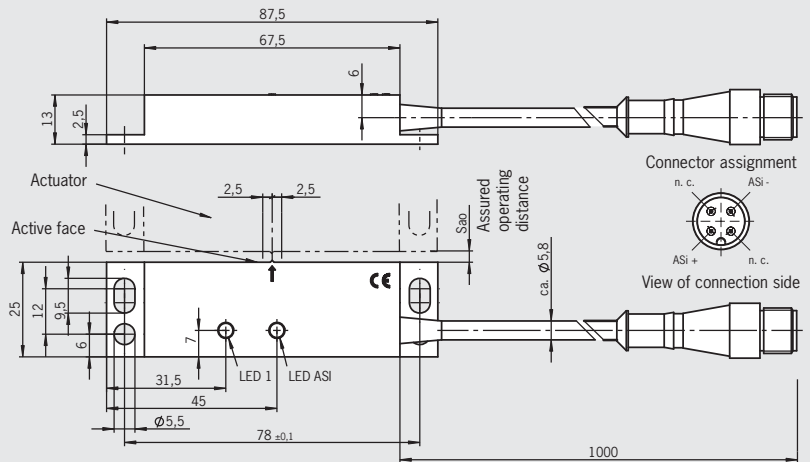
- ▶ Safety switches with integrated read head and integrated evaluation unit.
- ▶ LED diagnostic displays optional

### Non-contact safety switch CMS-R-AZA-01VL-AS1/actuator CMS-M-AC

Plug connector M12, switch-on distance 9 mm



#### Dimension drawing



The dimensions of the actuators are the same as those of the read heads, although the former have no connection cable.

#### Actuator

An appropriate actuator to suit the read head selected is required. The dimensions of the actuators are the same as those of the read heads, although the former have no connection cable.

#### AS-Interface inputs

- ▶ **DO - D3** Switch actuated/open
- Evaluation is performed via a safety monitor.

#### AS-Interface outputs

- ▶ **D1** LED 1 on read head (only CMS-R-AZA...)

#### LED function display

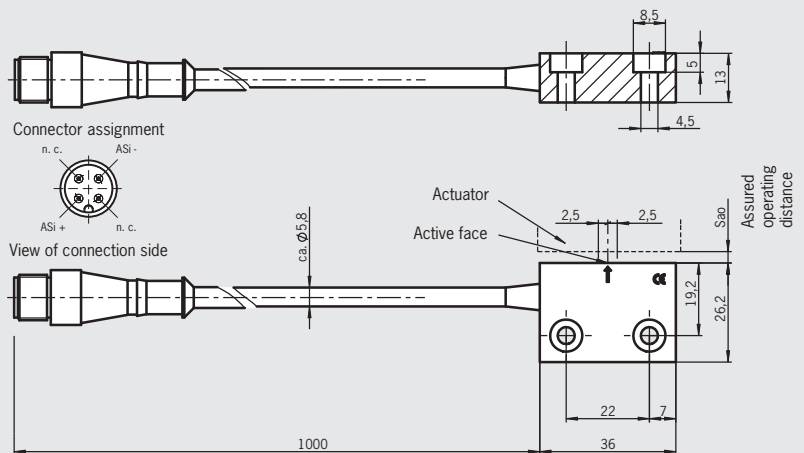
- ▶ The ASI LED (dual LED red/green) displays the colors red, green and yellow. The status of the switch and the bus is indicated via this LED.
- ▶ LED 1 can be connected via the AS-Interface bus, e.g. to indicate the door state.

#### Principle of operation

Reed contacts are installed in the read head of the safety system CMS. The contacts blades on the reed contacts are closed under the influence of the magnetic field from the actuator. The read head only responds to the specific mating component, that is a specific actuator which is allocated to the read head type.

### Non-contact safety switch CMS-R-BZB-01V-AS1/actuator CMS-M-BH

Plug connector M12, switch-on distance 7 mm



The dimensions of the actuators are the same as those of the read heads, although the former have no connection cable.

#### Ordering table

Series	Connection	Assured switch-on distance Sao [mm]	Order No./item	
			Safety switch	Related actuator
CMS	PVC connection cable, length 1 m, with plug connector M12	9	<b>105090</b> CMS-R-AZA-01PL-AS1	<b>084592</b> CMS-M-AC
		7	<b>105094</b> CMS-R-BZB-01P-AS1	<b>092025</b> CMS-M-BH

## Safety switch CET...AS1

- ▶ Safety switch with guard locking and integrated evaluation electronics
- ▶ Locking force up to 6500 N
- ▶ Up to category 4 / PL e according to EN ISO 13849-1



### Unicode evaluation

Each actuator is unique. The safety switch detects only the actuator that has been taught-in. Additional actuators can be taught in. Only the last actuator taught in is detected.

### Auxiliary release

Is used for releasing the guard locking with the aid of a tool. The auxiliary release must be sealed to prevent tampering (for example with sealing lacquer).

**CET3** Closed-circuit current principle, guard locking by spring force. Release by control of AS-i output 0.

**CET4** Open-circuit current principle, guard locking by control of AS-i output 0. Release by spring force.

### Control of the guard locking solenoid

The guard locking solenoid is controlled by the control system via AS-Interface bus bit D0.

### AS-Interface inputs

- ▶ **D0, D1** Door monitoring
- ▶ **D2, D3** Guard lock monitoring

Evaluation is performed via a safety monitor.

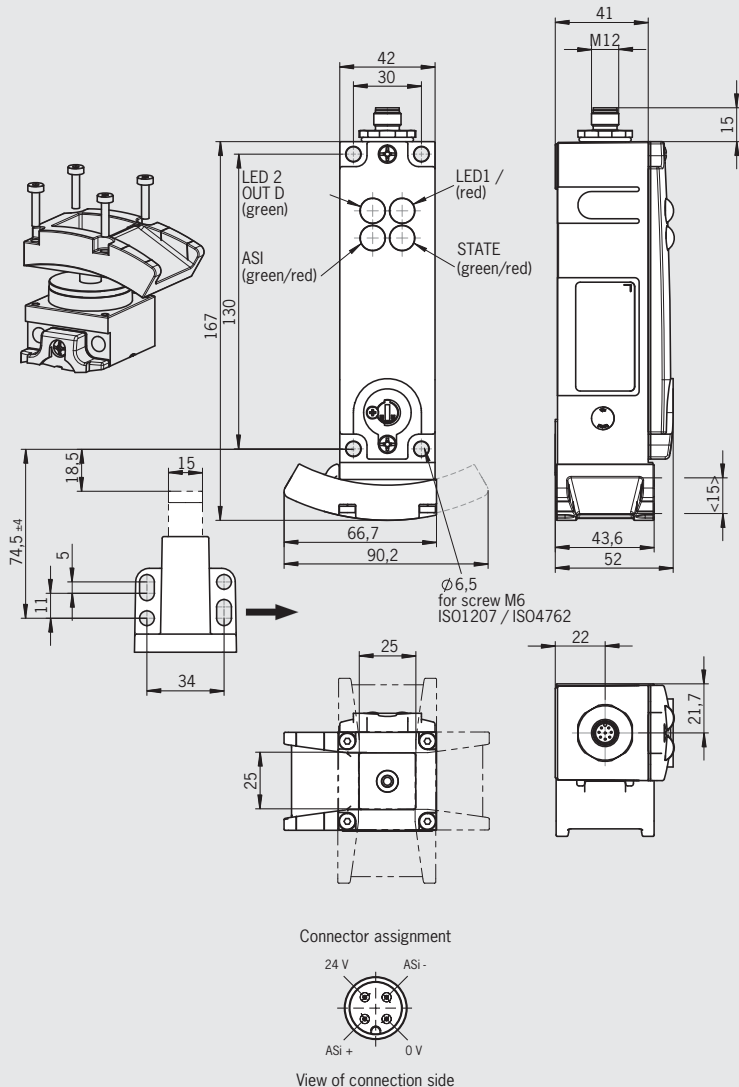
### AS-Interface outputs

- ▶ **D0** Guard locking
- ▶ **D1** Red LED
- ▶ **D2** Green LED

## Safety switch CET...AS1

Plug connector M12

### Dimension drawing



### LED function display

- ▶ The ASI/LED indicates the operating voltage on the bus.
- ▶ The State LED indicates if a fault has been detected on the AS-Interface bus.
- ▶ The green and the red LEDs can be controlled as required by the control system via the bus using bits D1 and D2.

### Ordering table

Series	Connection	Guard locking device	Switching element	Order No./item
CET	SEM 4 Plug connector M12	3 Mechanical	SK: 1 NC ⊕ UK: 1 NC ⊕	<b>111214</b> CET3-AS-CRA-AB-50X-SJ-AS1-111214
		4 Electrical	SK: 1 NC ⊕ UK: 1 NC ⊕	<b>113631</b> CET4-AS-CRA-AB-50X-SJ-AS1-113631



## Safety Basis Monitor SBM

- ▶ Four safe inputs, two safe semiconductor outputs
- ▶ AS-i monitor, master and connection for 24V power supply unit (AS-interface Power 24V) integrated
- ▶ Chip card and USB for parameter assignment



### AS-i master

The SBM includes an AS-i Master, which can be switched off as an option. This permits several SBMs to be operated on an AS-Interface circuit. Configuration is performed with a PC. LEDs signal the state on the device.

### OSSDs (Output Signal Switching Devices)

- ▶ Two OSSDs (Output Signal Switching Device) with semiconductor outputs
- ▶ 14 additional safe AS-i outputs can be controlled

### Safe inputs

There are four safe inputs to which safety devices without AS-i bus can be directly connected. The inputs can be optionally used as standard inputs/monitoring outputs, e.g. for feedback loop or start button.

### Logic functions

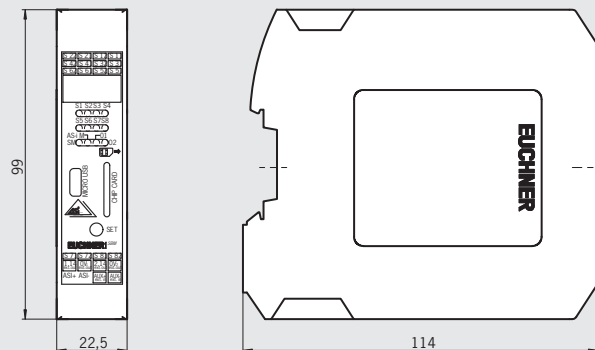
Programmable with AsiMon software. All safety components can be programmed with different functions as inputs. The inputs can be linked with AND or OR gates or via logic functions such as FlipFlop, switch-on delay, turn-off delay or pulses. Different programs can be stored on memory cards.

### AS-Interface monitor

The monitor controls one AS-i circuit with up to 31 safe slaves and up to 16 OSSDs, of which 2 are built into the device. 14 circuits can be used externally in addition.

## Safety Basis Monitor SBM

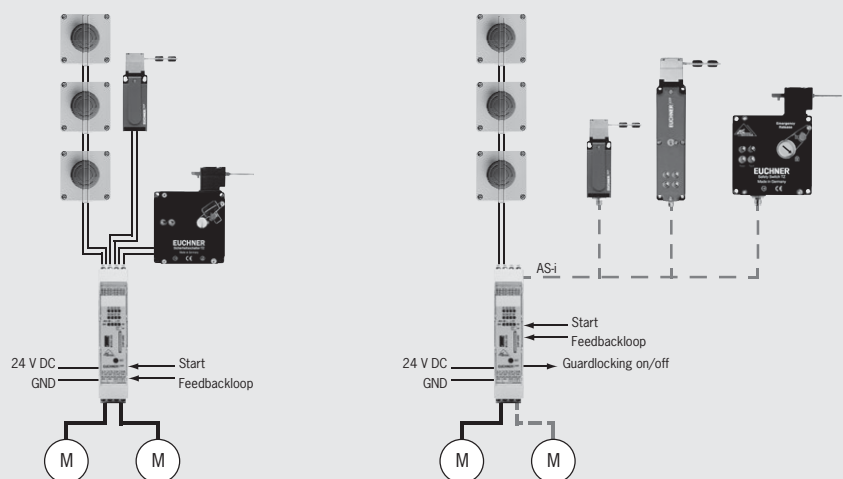
### Dimension drawings



### Block diagrams

Simple application with standard wiring

Mixed application with standard wiring



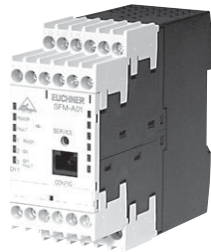
### Ordering table

Series	Inputs	Number of AS-i OSSDs	Order No./item
SBM	4	2 internal, 14 external	113830 SBM-11-N08

## AS-Interface Safety at Work safety monitors SFM



- ▶ Single-channel or dual-channel
- ▶ Start inputs
- ▶ Monitoring outputs
- ▶ Adjustable time-delay



### OSSDs (Output Signal Switching Devices)

**SFM-...1:** One OSSD with 2 normally closed contacts

**SFM-...2:** Two OSSDs with 4 normally closed contacts

### Auxiliary contacts

One auxiliary contact per channel.

### Inputs

One start input per channel and one feedback loop per channel. Freely usable on SFM-B...

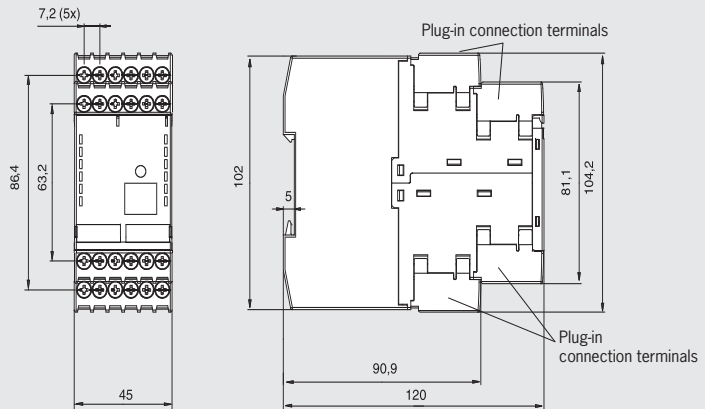
### Logic functions

Programmable with AsiMon software. All safety components can be programmed with different functions as inputs. The inputs can be linked with AND or OR gates.

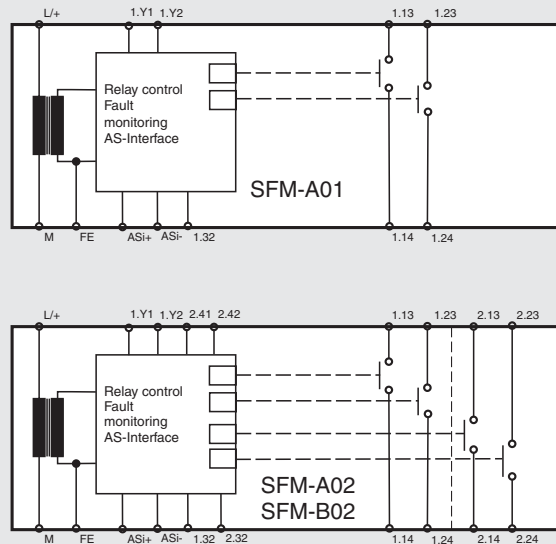
With the monitors SFM-B..., additional logic functions such as FlipFlop, switch-on delay, turn-off delay or pulses are available. The number of links and the memory depth are larger than on the SFM-A... devices.

## Safety monitors SFM

### Dimension drawings



### Block diagrams



For connector assignment, see technical data on Page 57

### Ordering table

Series	Version	Number of AS-i outputs	Channels	Order No./item
SFM	A Standard	0	1	<b>085638</b> SFM-A01
		0	2	<b>085639</b> SFM-A02
	B Expanded	0	2	<b>087891</b> SFM-B02





## AS-Interface Safety at Work safe output SOM

- ▶ 1 redundant OSSD
- ▶ Control by GMOx
- ▶ Control by machine control
- ▶ Up to 4 inputs
- ▶ Diagnostics via AS-Interface



### OSSD (Output Signal Switching Device)

The OSSD is of redundant design according to category 4 EN ISO 13849-1. Safety-related control is via the bus by a suitable monitor, for example by a GMOx. Operational switching is also possible directly by the control system with appropriate parameter settings.

### Inputs and outputs

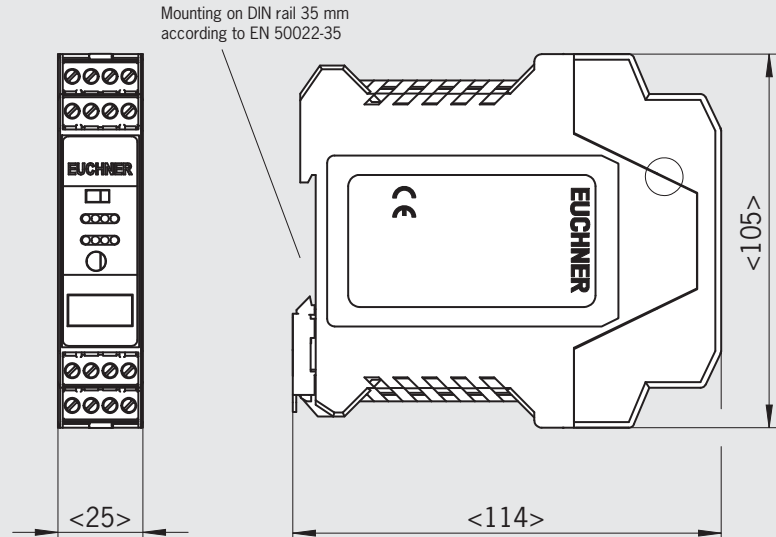
A feedback loop can be connected directly to the SOM. Depending on the parameter settings, further inputs and outputs can also be used.

### LED function display

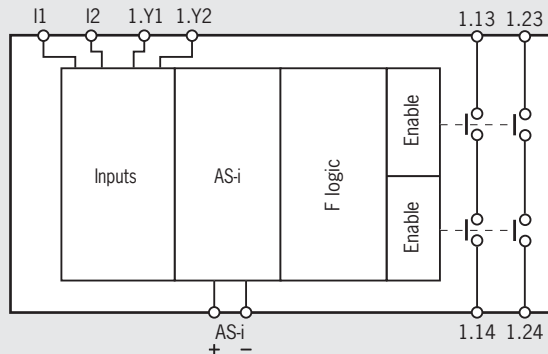
- ▶ **PWR** Green, AS-Interface power
- ▶ **ASi** Red, bus communication
- ▶ **OUT** Yellow, state of OSSD
- ▶ **ALARM** Red, can be set as required by control system
- ▶ **I1...I3** State of the related input
- ▶ **1.Y1** State of the input

### Safe output SOM

#### Dimension drawings



#### Block diagram



### Ordering table

Series	Inputs	Outputs	OSSDs (Output Signal Switching Devices)	Order No./item
SOM	4	0	1	<b>103489</b> SOM-4E-0A-C1

## AS-Interface Safety at Work safety monitor with integrated gateway GMOx



- ▶ One or two AS-i masters
- ▶ Display and buttons for diagnostics and adjustment
- ▶ Memory card for different programs
- ▶ Adjustable time-delay
- ▶ 16 OSSDs



### Gateway to Profibus

For connection to a Profibus DP as a slave and as a master for one or two AS-i buses according to specification 3.0. Detection of earth fault, double addressing and EMC problems. Rapid commissioning with the display without PC. Direct display of faults with plain-text messages. Comprehensive AS-i diagnostics integrated. AS-i configuration software is available.

### OSSDs (Output Signal Switching Devices), AS-i outputs

- ▶ Two OSSDs (Output Signal Switching Devices) with two redundant normally closed contacts each
- ▶ Two OSSDs (Output Signal Switching Device) with semiconductor outputs
- ▶ 12 additional safe AS-i outputs can be controlled

### Inputs

- ▶ 4 inputs, freely selectable

### Logic functions

Programmable with AsiMon software. All safety components can be programmed with different functions as inputs. The inputs can be linked with AND or OR gates or via logic functions such as FlipFlop, switch-on delay, turn-off delay or pulses. Different programs can be stored on a memory card.

### AS-Interface monitor

The monitor controls two AS-i circuits with up to 62 safe slaves and up to 16 outputs.

### Display and buttons

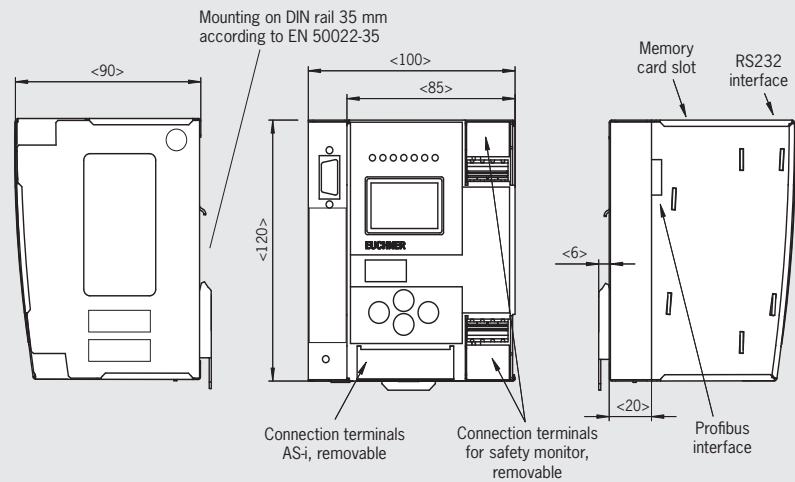
The display is used to operate the gateway functionality as well as the monitor at the same time. The diagnostics and maintenance functions are considerably expanded compared to the SFM monitors. They can also be launched on the display without a PC monitor. Incorporated security functions allow the programmed functionality to be protected and monitored.

### Ordering table

Series	Bus connection	AS-i master	Number of AS-i outputs	OSSDs (Output Signal Switching Devices)	Order No./item
GMOx	PR Profibus	1	16	4 + 12 external	<b>103267</b> GMOX-PR-12DN-C16
		2	16	4 + 12 external	<b>103302</b> GMOX-PR-22DN-C16

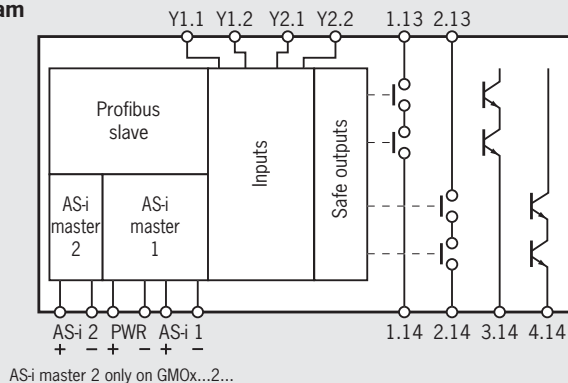
### Safety monitor GMOx

#### Dimension drawing



Please order connection kit separately; see page 34

#### Block diagram



For connector assignment, see technical data on Page 60

**Important:** One connection kit must be ordered for each safety monitor (see page 26).

## Accessories

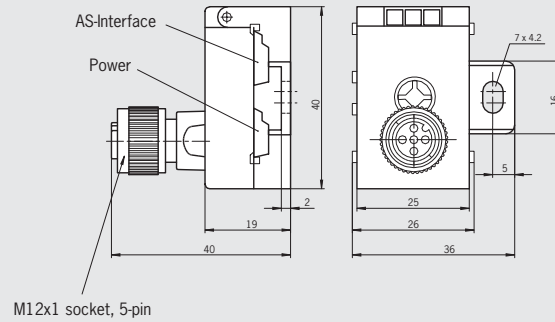
- ▶ Passive bus coupling module BCM-A-P2...



For connection of components with integrated AS-Interface and M12 plug connector to the AS-Interface ribbon cables. Both the bus and auxiliary power are converted from the ribbon cable to an M12 socket. The coupling module is suitable for safety components and for standard components. It is particularly suitable for EUCHNER safety switches with guard locking.

### Passive bus coupling module BCM-A-P2...

#### Dimension drawing



#### Ordering table

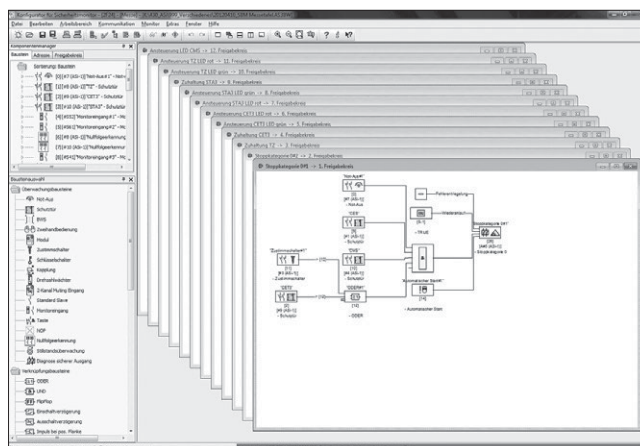
Version	Connections	Order No./item
<b>BCM-A-P2</b>	AS-Interface ribbon cable, auxiliary power ribbon cable M12 socket	<b>105756</b> BCM-A-P2-SEM4-1
Connection cable M12 with straight plug connectors, length 1 m PUR		<b>089420</b> Connection cable M12

## Accessories and software for monitors SBM, SFM and GMOx

The software is required for programming the EUCHNER safety monitors. All safety monitors can be programmed with the same software. A Windows®-equipped PC is required. All Safety at Work manuals in various languages are included on the CD.

A cable set SFM or the cable set GMOx is required to connect the PC. The cable set SFM includes a transfer cable for direct read-out from monitor to monitor.

Additional memory cards can be ordered for the gateway monitors GMOx. Plug-in connections with screw terminals and cage pull springs are available.

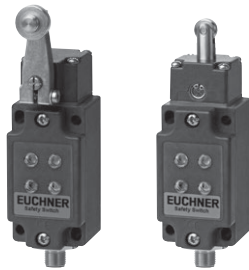


## Ordering table

Version	Suitability	Order No./item
<b>AsiMon Configuration software</b>	For all AS-Interfaces Safety at Work safety monitors	<b>088053</b> AsiMon SW
<b>Cable set SFM</b> <sup>1)</sup>	For all monitors SFM...	<b>087299</b> Cable set SFM
<b>Connection kit Cage-clamp terminals GMOx</b>	Gateway monitors GMOx	<b>100256</b> ZMO-ZB-KK8-M
<b>Connection kit Cage-clamp terminals ESM-F</b>	4 pcs. For monitors SBM	<b>097195</b> ESM-F-KK4
<b>Programming cable GMOx</b>	Gateway monitors GMOx	<b>100437</b> ZMO-ZB-PGK
<b>USB connecting cables SBM</b>	For monitors SBM	<b>113832</b> SBM-ZB-PGK
<b>1 memory card</b>	Gateway monitors GMOx	<b>103580</b> ZMO-ZB-MB1
	For monitors SBM	<b>100875</b> ZMO-ZB-MB10

1) For programming and exchange

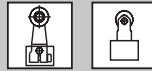
## Position switch NZ



### Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
B10d	2 x 10 <sup>7</sup> operating cycles	

### Switch



Parameter	Value	Unit
Housing material	Anodized die-cast alloy	
Mechanical life	30 x 10 <sup>6</sup> operating cycles	
Ambient temperature	- 25 ... + 70	°C
Weight	Approx. 0.3	kg
Approach speed, min.	0.1	m/min
Approach speed max. <sup>1)</sup> depending on actuator	<b>HS</b> 60	<b>RS</b> 20 m/min
Actuating force, min.	30	N

### AS-Interface connection



Parameter	Value	Unit
Connection	Plug connector	
Version	M12 (4-pin)	
Degree of protection acc. to IEC 60529	IP 67 <sup>2)</sup>	
Rated insulation voltage U <sub>i</sub>	50	V AC/DC
Switching principle	Slow-action switching contact 2 NC ⇄	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026	
<b>AS-Interface data</b>		
Acc. to AS-Interface specification 2.1	EA code: 7	ID code: B
Total current consumption, max.	45	mA
Valid AS-Interface addresses	1 - 31	
<b>AS-Interface inputs</b>		
Acc. to AS-Interface Safety at Work		
Positively driven NC contact 1	D0, D1	
Positively driven NC contact 2	D2, D3	
<b>AS-Interface outputs</b>		
D0 and D3	Not used	
D1	Red LED, 1 = LED on	
D2	Green LED, 1 = LED on	
AS-Interface Power LED	Green, AS-Interface Power on	
AS-Interface Fault LED	Red, offline phase or address 0	

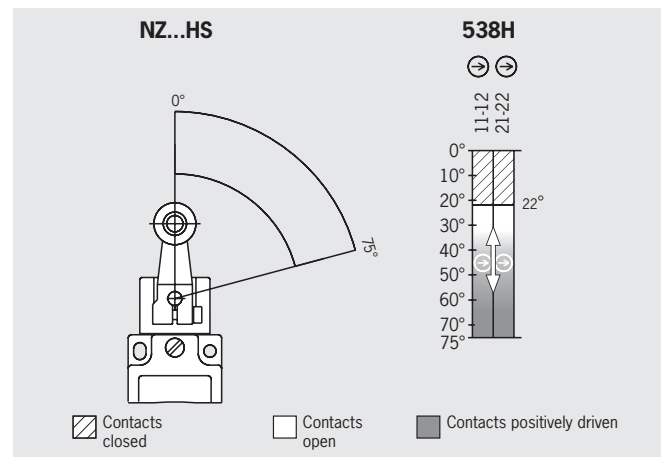
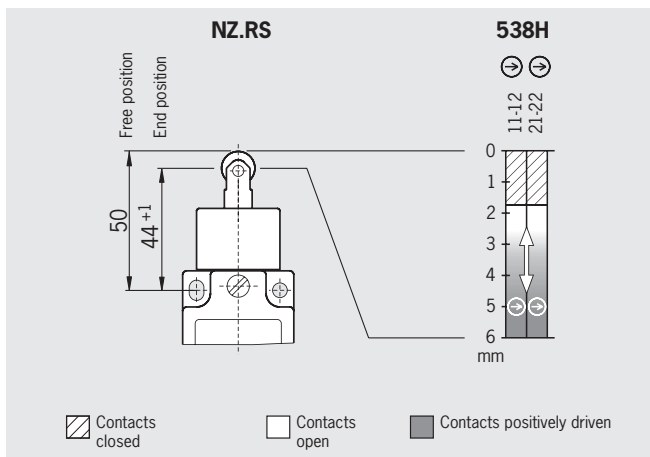
1) The approach speed given applies in conjunction with EUCHNER trip dogs at an approach angle of 30°. At a smaller approach angle this approach speed can be exceeded.

2) Screwed tight with the related plug connector

Travel diagram  
NZ.RS



Travel diagram  
NZ.HS



## Safety switch NZ.VZ



### Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
B10d	4.5 x 10 <sup>6</sup> operating cycles	

### Switch



Parameter	Value	Unit
Housing material	Anodized die-cast alloy	
Mechanical life	2 x 10 <sup>6</sup> operating cycles	
Ambient temperature	- 25 ... + 70	°C
Weight	Approx. 0.3	kg
Approach speed, max.	20	m/min
Approach speed, min.	0.1	m/min
Actuating force	35	N
Extraction force	35	N
Retention force	8	N

### AS-Interface connection



Parameter	Value	Unit
Connection	Plug connector	
Version	M12 (4-pin)	
Degree of protection acc. to IEC 60529	IP 67 <sup>2)</sup>	
Rated insulation voltage U <sub>i</sub>	50	V AC/DC
Switching principle	Slow-action switching contact 2 NC ⇄	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026	
<b>AS-Interface data</b>		
Acc. to AS-Interface specification 2.1	EA code: 7	ID code: B
Total current consumption, max.	45	mA
Valid AS-Interface addresses	1 - 31	
<b>AS-Interface inputs</b>		
Acc. to AS-Interface Safety at Work		
Positively driven NC contact 1	D0, D1	
Positively driven NC contact 2	D2, D3	
<b>AS-Interface outputs</b>		
D0 and D3	Not used	
D1	Red LED, 1 = LED on	
D2	Green LED, 1 = LED on	
AS-Interface Power LED	Green, AS-Interface Power on	
AS-Interface Fault LED	Red, offline phase or address 0	

2) Screwed tight with the related plug connector



## Safety switch TZ with guard locking and guard lock monitoring



### Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
B10d	3 x 10 <sup>6</sup> operating cycles	

### Switch



Parameter	Value	Unit
Housing material	Anodized die-cast alloy	
Mechanical life	1 x 10 <sup>6</sup> operating cycles	
Ambient temperature	-25 ... +55	°C
Weight	Approx. 1.2	kg
Approach speed, max.	20	m/min
Actuating force	35	N
Extraction force	30	N
Retention force	10	N
Locking force max.	2000	N
Locking force F <sub>Zh</sub> in accordance with test principles GS-ET-19	1500	N
<b>Guard locking solenoid</b>		
Solenoid operating voltage (auxiliary voltage on black AS-Interface cable)	24 V +10/-15% Power supply unit with electrical isolation (IEC 60742, PELV)	V DC
Solenoid operating current	350	mA
Duty cycle	100	%

### AS-Interface connection



Parameter	Value	Unit
Connection	Plug connector	
Version	M12 (4-pin)	
Degree of protection acc. to IEC 60529	IP 67 <sup>2)</sup>	
Rated insulation voltage U <sub>i</sub>	50	V AC/DC
Switching principle SK, ÜK	Slow-action switching contact 1 NC contact each ⇄	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026	
<b>AS-Interface data</b>		
Acc. to AS-Interface specification 2.1	EA code: 7 ID code: B	
Total current consumption, max.	45	mA
Valid AS-Interface addresses	1 - 31	
<b>AS-Interface inputs</b>		
Acc. to AS-Interface Safety at Work		
Positively driven NC contact 1	D0, D1	
Positively driven NC contact 2	D2, D3	
<b>AS-Interface outputs</b>		
D0	Guard locking solenoid, 1 = solenoid energized	
D1	Red LED, 1 = LED on	
D2	Green LED, 1 = LED on	
AS-Interface Power LED	Green, AS-Interface Power on	
AS-Interface Fault LED	Red, offline phase or address 0	

2) Screwed tight with the related plug connector

## Safety switch NX



### Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
B10d	4.5 x 10 <sup>6</sup> operating cycles	

### Switch



Parameter	Value	Unit	
Housing material	Die-cast alloy, cathodically dipped		
Mechanical life	2 x 10 <sup>6</sup> operating cycles		
Ambient temperature	- 20 ... + 70	°C	
Weight	Approx. 0.4	kg	
Approach speed, max.	20	m/min	
Actuating force	40	N	
Extraction force	50	N	
Retention force	10	N	
Insertion depth	Standard actuator	Overtravel actuator	
Required insertion depth S <sub>min</sub>	32	32	mm
Maximum insertion depth S <sub>max</sub>	33	40	mm
Actuator travel (in the locked state)	6	13	mm

### AS-Interface connection



Parameter	Value	Unit
Connection	Plug connector	
Version	M12 (4-pin)	
Degree of protection acc. to IEC 60529	IP 67 <sup>2)</sup>	
Rated insulation voltage U <sub>i</sub>	50	V AC/DC
Switching principle	Slow-action switching contact 2 NC ⇄	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026	
<b>AS-Interface data</b>		
Acc. to AS-Interface specification 2.1	EA code: 7	ID code: B
Total current consumption, max.	45	mA
Valid AS-Interface addresses	1 - 31	
<b>AS-Interface inputs</b>		
Acc. to AS-Interface Safety at Work		
Positively driven NC contact 1	D0, D1	
Positively driven NC contact 2	D2, D3	
<b>AS-Interface outputs</b>		
D0 and D3	Not used	
D1	Red LED, 1 = LED on	
D2	Green LED, 1 = LED on	
AS-Interface Power LED	Green, AS-Interface Power on	
AS-Interface Fault LED	Red, offline phase or address 0	

2) Screwed tight with the related plug connector

## Safety switch TX with guard locking and guard lock monitoring



### Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
B10d	6 x 10 <sup>6</sup> operating cycles	

### Switch



Parameter	Value	Unit	
Housing material	Die-cast alloy, cathodically dipped		
Mechanical life	> 1 x 10 <sup>6</sup> operating cycles		
Ambient temperature	- 20 ... + 50	°C	
Weight	Approx. 0.8	kg	
Approach speed, max.	20	m/min	
Actuating force	35	N	
Extraction force	35	N	
Retention force	20	N	
Locking force max.	1700	N	
Locking force F <sub>ZH</sub> in accordance with test principles GS-ET-19	1300	N	
Insertion depth	Standard actuator	Overtravel actuator	
Required insertion depth s <sub>min</sub>	32	32	mm
Maximum insertion depth s <sub>max</sub>	33	40	mm
Actuator travel (in the locked state)	6	13	mm
<b>Guard locking solenoid</b>			
Solenoid operating voltage (auxiliary voltage on black AS-Interface cable)	24 V +10/-15% Power supply unit with electrical isolation (IEC 60742, PELV)	V DC	
Solenoid operating current	330	mA	
Duty cycle	100	%	

### AS-Interface connection



Parameter	Value	Unit
Connection	Plug connector	
Version	M12 (4-pin)	
Degree of protection acc. to IEC 60529	IP 67 <sup>2)</sup>	
Rated insulation voltage U <sub>i</sub>	50	V AC/DC
Switching principle	Slow-action switching contact 2 NC ⊖	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026	
<b>AS-Interface data</b>		
Acc. to AS-Interface specification 2.1	EA code: 7	ID code: B
Total current consumption, max.	45	mA
Valid AS-Interface addresses	1 - 31	
<b>AS-Interface inputs</b>		
Acc. to AS-Interface Safety at Work		
Positively driven NC contact 1	D0, D1	
Positively driven NC contact 2	D2, D3	
<b>AS-Interface outputs</b>		
D0	Guard locking solenoid, 1 = solenoid energized	
D1	Red LED, 1 = LED on	
D2	Green LED, 1 = LED on	

2) Screwed tight with the related plug connector

## Safety switch STA with guard locking and guard lock monitoring



### Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
B10d	1.2 x 10 <sup>7</sup> operating cycles	

### Switch



Parameter	Value	Unit	
Housing material	Anodized die-cast		
Mechanical life	1 x 10 <sup>6</sup> operating cycles		
Ambient temperature	- 20 ... + 55	°C	
Weight	Approx. 0.6	kg	
Approach speed, max.	20	m/min	
Actuating force	35	N	
Extraction force (not locked)	30	N	
Retention force	20	N	
Locking force max.	3000	N	
Locking force F <sub>Zh</sub> in accordance with test principles GS-ET-19	2300	N	
Insertion depth (minimum required travel + permissible overtravel)	Actuator S standard	Actuator L for insertion funnel	
Lateral approach direction (h)	24.5 + 5	28.5 + 5	mm
Approach direction from above (v)	24.5 + 5	28.5 + 5	mm
<b>Guard locking solenoid</b>			
Solenoid operating voltage (auxiliary voltage on black AS-Interface cable)	24 V +10/-15% Power supply unit with electrical isolation (IEC 60742, PELV)	V DC	
Solenoid operating current	300	mA	
Duty cycle	100	%	

### AS-Interface connection



Parameter	Value	Unit
Connection	Plug connector	
Version	M12 (4-pin)	
Degree of protection acc. to IEC 60529	IP 67 <sup>2)</sup>	
Rated insulation voltage U <sub>i</sub>	50	V AC/DC
Switching principle	Slow-action switching contact 1 NC contact each ⊖	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026	
<b>AS-Interface data</b>		
Acc. to AS-Interface specification 2.1	EA code: 7	ID code: B
Total current consumption, max.	45	mA
Valid AS-Interface addresses	1 - 31	
<b>AS-Interface inputs</b>		
Door monitoring contact SK	D0, D1	
Solenoid monitoring contact UK	D2, D3	
<b>AS-Interface outputs</b>		
D0	Guard locking solenoid, 1 = solenoid energized	
D1	Red LED, 1 = LED on	
D2	Green LED, 1 = LED on	
AS-Interface Power LED	Green, AS-Interface Power on	
AS-Interface Fault LED	Red, offline phase or address 0	

2) Screwed tight with the related plug connector

## Safety switch GP



### Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
B10d	3 x 10 <sup>6</sup> operating cycles	

### Switch



Parameter	Value		Unit
Housing material	Reinforced thermoplastic		
Mechanical life	2 x 10 <sup>6</sup> operating cycles		
Ambient temperature	- 20 ... + 55		°C
Weight	Approx. 0.16		kg
Approach speed, max.	20		m/min
Actuating force	10		N
Extraction force	20		N
Retention force	2		N
Insertion depth (minimum required travel + permissible overtravel)	Actuator S standard	Actuator L overtravel	
Lateral approach direction (h)	28 + 2	28 + 7	mm
Approach direction from above (v)	29.5 + 1.5	29.5 + 7	mm

### AS-Interface connection



Parameter	Value		Unit
Connection	Plug connector		
Version	M12 (4-pin)		
Degree of protection acc. to IEC 60529	IP 67 <sup>2)</sup>		
Rated insulation voltage U <sub>i</sub>	50		V AC/DC
Switching principle	Slow-action switching contact 2 NC ⊕		
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026		
<b>AS-Interface data</b>			
Acc. to AS-Interface specification 2.1	EA code: 7	ID code: B	
Total current consumption, max.	45		mA
Valid AS-Interface addresses	1 - 31		
<b>AS-Interface inputs</b>	Acc. to AS-Interface Safety at Work		
Positively driven NC contact 1	D0, D1		
Positively driven NC contact 2	D2, D3		
AS-Interface Power LED	Green, AS-Interface Power on		
AS-Interface Fault LED	Red, offline phase or address 0		

2) Screwed tight with the related plug connector

## Safety switch SGP



### Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
B10d	3 x 10 <sup>6</sup> operating cycles	

### Switch



Parameter	Value	Unit	
Material			
Housing	Reinforced thermoplastic		
Actuating head	Die-cast aluminum		
Cam in actuating head	Stainless steel		
Mechanical life	2 x 10 <sup>6</sup> operating cycles		
Ambient temperature	- 20 ... + 55	°C	
Weight	Approx. 0.16	kg	
Approach speed, max.	20	m/min	
Actuating force	25	N	
Extraction force	25	N	
Retention force	10	N	
Insertion depth (minimum required travel + permissible overtravel)	Actuator <i>S</i> standard	Actuator <i>L</i> for insertion funnel	
Lateral approach direction (h)	24.5 + 5	28.5 + 5	mm
Approach direction from above (v)	24.5 + 5	28.5 + 5	mm

### AS-Interface connection



Parameter	Value	Unit
Connection	Plug connector	
Version	M12 (4-pin)	
Degree of protection acc. to IEC 60529	IP 67 <sup>2)</sup>	
Rated insulation voltage U <sub>i</sub>	50	V AC/DC
Switching principle	Slow-action switching contact 2 NC ⇄	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026	
<b>AS-Interface data</b>		
Acc. to AS-Interface specification 2.1	EA code: 7	ID code: B
Total current consumption, max.	45	mA
Valid AS-Interface addresses	1 - 31	
<b>AS-Interface inputs</b>	Acc. to AS-Interface Safety at Work	
Positively driven NC contact 1	D0, D1	
Positively driven NC contact 2	D2, D3	
AS-Interface Power LED	Green, AS-Interface Power on	
AS-Interface Fault LED	Red, offline phase or address 0	

2) Screwed tight with the related plug connector

## Safety switch TP with guard locking and guard lock monitoring



### Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
B10d	3 x 10 <sup>6</sup> operating cycles	

### Switch



Parameter	Value		Unit
Housing material	Reinforced thermoplastic		
Mechanical life	1 x 10 <sup>6</sup> operating cycles		
Ambient temperature	- 20 ... + 55		°C
Weight	Approx. 0.5		kg
Approach speed, max.	20		m/min
Actuating force	10		N
Extraction force (not locked)	20		N
Retention force	10		N
Locking force max.	1300		N
Locking force F <sub>th</sub> in accordance with test principles GSET-19	1000		N
Insertion depth (minimum required travel + permissible overtravel)	Actuator S standard	Actuator L for insertion funnel	
Lateral approach direction (h)	28 + 2	28 + 7	mm
Approach direction from above (v)	29.5 + 1.5	-	mm
<b>Guard locking solenoid</b>			
Solenoid operating voltage (auxiliary voltage on black AS-Interface cable)	24 V +10/-15% Power supply unit with electrical isolation (IEC 60742, PELV)		V DC
Solenoid operating current	300		mA
Duty cycle	100		%

### AS-Interface connection



Parameter	Value		Unit
Connection	Plug connector		
Version	M12 (4-pin)		
Degree of protection acc. to IEC 60529	IP 67 <sup>2)</sup>		
Rated insulation voltage U <sub>i</sub>	50		V AC/DC
Switching principle	Slow-action switching contact 1 NC contact each ⊕		
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026		
<b>AS-Interface data</b>			
Acc. to AS-Interface specification 2.1	EA code: 7	ID code: B	
Total current consumption, max.	45		mA
Valid AS-Interface addresses	1 - 31		
<b>AS-Interface inputs</b>			
Acc. to AS-Interface Safety at Work			
Version AS1	D0, D1 ▶	Door monitoring contact SK	
	D2, D3 ▶	Solenoid monitoring contact UK	
Version AS2	D0, D1 ▶	Positively driven NC contact SK 1	
	D2, D3 ▶	Positively driven NC contact SK 2	
<b>AS-Interface outputs</b>			
D0	Guard locking solenoid, 1 = solenoid energized		
D1	Red LED, 1 = LED on		
D2	Green LED, 1 = LED on		
AS-Interface Power LED	Green, AS-Interface Power on		
AS-Interface Fault LED	Red, offline phase or address 0		

2) Screwed tight with the related plug connector

## Safety switch STP with guard locking and guard lock monitoring



### Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
B10d	5 x 10 <sup>6</sup> operating cycles	

### Switch



Parameter	Value	Unit	
Material	Housing Actuating head Cam in actuating head	Reinforced thermoplastic Die-cast aluminum Stainless steel	
Mechanical life	1 x 10 <sup>6</sup> operating cycles		
Ambient temperature	- 20 ... + 55	°C	
Weight	Approx. 0.5	kg	
Approach speed, max.	20	m/min	
Actuating force	35	N	
Extraction force (not locked)	30	N	
Retention force	20	N	
Locking force max.	2500	N	
Locking force F <sub>20</sub> in accordance with test principles GSET-19	2000	N	
Insertion depth (minimum required travel + permissible overtravel)	Actuator S standard	Actuator L for insertion funnel	
Lateral approach direction (h)	24.5 + 5	28.5 + 5	mm
Approach direction from above (v)	24.5 + 5	28.5 + 5	mm
<b>Guard locking solenoid</b>			
Solenoid operating voltage (auxiliary voltage on black AS-Interface cable)	24 V +10/-15% Power supply unit with electrical isolation (IEC 60742, PELV)	V DC	
Solenoid operating current	300	mA	
Duty cycle	100	%	

### AS-Interface connection



Parameter	Value	Unit
Connection	Plug connector	
Version	M12 (4-pin)	
Degree of protection acc. to IEC 60529	IP 67 <sup>2)</sup>	
Rated insulation voltage U <sub>i</sub>	50	V AC/DC
Switching principle	Slow-action switching contact 1 NC contact each ⊖	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026	
<b>AS-Interface data</b>		
Acc. to AS-Interface specification 2.1	EA code: 7	ID code: B
Total current consumption, max.	45	mA
Solenoid supply via auxiliary power	400	
Solenoid supply via AS-i	1 - 31	
Valid AS-Interface addresses	Acc. to AS-Interface Safety at Work	
<b>AS-Interface inputs</b>		
Door monitoring contact SK	D0, D1	
Solenoid monitoring contact UK	D2, D3	
<b>AS-Interface outputs</b>		
D0	Guard locking solenoid, 1 = solenoid energized	
D1	Red LED, 1 = LED on	
D2	Green LED, 1 = LED on	
AS-Interface Power LED	Green, AS-Interface Power on	
AS-Interface Fault LED	Red, offline phase or address 0	

2) Screwed tight with the related plug connector



## Safety switch STP-TW with guard locking and guard lock monitoring



### Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
B10d	4.5 x 10 <sup>6</sup> operating cycles	

### Switch



Parameter	Value	Unit
Material	Housing	Reinforced thermoplastic
	Actuating head	Die-cast aluminum
	Cam in actuating head	Stainless steel
Mechanical life	1 x 10 <sup>6</sup> operating cycles	
Ambient temperature	- 20 ... + 55	°C
Weight	Approx. 0.6	kg
Approach speed, max.	20	m/min
Actuating force	35	N
Extraction force (not locked)	30	N
Retention force	20	N
Locking force max.	2500	N
Locking force F <sub>zh</sub> in accordance with test principles GSET-19	2000	N
Insertion depth (minimum required travel + permissible overtravel)	Actuator S standard	
Lateral approach direction (h)	24.5 + 5	mm
Approach direction from above (v)	24.5 + 5	mm
<b>Guard locking solenoid</b>		
Solenoid operating voltage (auxiliary voltage on black AS-Interface cable)	24 V +10/-15% Power supply unit with electrical isolation (IEC 60742, PELV)	V DC
Solenoid operating current	300	mA
Duty cycle	100	%

### AS-Interface connection



Parameter	Value	Unit
Connection	Plug connector	
Version	M12 (4-pin)	
Degree of protection acc. to IEC 60529	IP 67 <sup>2)</sup>	
Rated insulation voltage U <sub>i</sub>	50	V AC/DC
Switching principle	Slow-action switching contact 1 NC contact each ⊕	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026	
<b>AS-Interface data</b>		
Acc. to AS-Interface specification 2.1	EA code: 7	ID code: B
Total current consumption, max.	45	mA
Valid AS-Interface addresses	1 - 31	
<b>AS-Interface inputs</b>		
Door monitoring contact SK	D0, D1	
Solenoid monitoring contact UK	D2, D3	
<b>AS-Interface outputs</b>		
D0	Guard locking solenoid, 1 = solenoid energized	
D1	Red LED, 1 = LED on	
D2	Green LED, 1 = LED on	
AS-Interface Power LED	Green, AS-Interface Power on	
AS-Interface Fault LED	Red, offline phase or address 0	

2) Screwed tight with the related plug connector

## Enabling switches ZSA and ZSB



### Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
B10d	1 x 10 <sup>5</sup> operating cycles	

### Hand-held version G1

Parameter	Value	Unit
Housing material	Polyamide, black	
Protective cap material	CR (neoprene), black	
Ambient temperature	- 5 ... + 50	°C
Weight	Approx. 0.4 (no cable)	kg

### AS-Interface connection

Parameter	Value	Unit
Connection	Plug connector	
Version	M12 (4-pin)	
Degree of protection acc. to IEC 60529	IP 67 <sup>2)</sup> / IP 65 with buttons <sup>2)</sup>	
Rated insulation voltage U <sub>i</sub>	50	V AC/DC
Switching principle	Three-stage, dual-channel, 2 NO	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026	
<b>AS-Interface data</b>		
Acc. to AS-Interface specification 2.1	EA code: 0	ID code: B
Total current consumption, max.	45	mA
Valid AS-Interface addresses	1 - 31	
<b>AS-Interface inputs</b>		
Acc. to AS-Interface Safety at Work		
NO contact E1	D0, D1	
NO contact E2	D2, D3	
Plus button (only ZSB)	Parameter bit P0	
Minus button (only ZSB)	Parameter bit P1	

2) Screwed tight with the related plug connector

## Non-contact safety switch CMS



### Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
Category	3	
Performance Level (PL)	e	
PFF <sub>d</sub>	4.29 x 10 <sup>8</sup>	
Mission time	20	years

### Evaluation unit

Parameter	Value	Unit
<b>Read head</b>		
Housing material	Fiber glass reinforced PPS	
Ambient temperature	-20 ... +60	°C
Degree of protection acc. to EN 60529	IP 67	
Installation position	Any, alignment with actuator should be kept in mind (markings)	
Connection	Connection cable with M12 plug connector	
Cable length	1	m
Cable material	PVC	
Method of operation	Magnetic, reed contact	
Mech. life	100 x 10 <sup>6</sup> operating cycles	
Vibration resistance	10 ... 55 Hz, amplitude 1 mm	
Shock resistance	30 g/ 11 ms	
<b>Actuator</b>		
Housing material	Fiber glass reinforced PPS	
Ambient temperature	-20 ... +60	°C
Degree of protection acc. to EN 60529	IP 67	
Installation position	Any, alignment with read head should be kept in mind (markings)	
Method of operation	Magnetic	
Vibration resistance	10 ... 55 Hz, amplitude 1 mm	
Shock resistance	30 g/ 11 ms	
<b>Distances with read head</b>		
	CMS...AZA...	CMS...BZB...
Switch-on distance S <sub>ao</sub>	9	7
Assured switch-off distance S <sub>ar</sub>	70	40
Center offset m between actuator and read head	± 2.5 at a distance of s = 3	
<b>Times</b>		
Max. time-delay from state change	5	ms

### AS-Interface connection




Parameter	Value	Unit
<b>AS-Interface data</b>		
Acc. to AS-Interface specification 3.2	CMS-R-AZA... CMS-R-BZB...	EA code: 7 EA code: 0
		ID code: B ID code: B
Operating voltage AS-Interface	26.5 ... 31.5	V DC
Total current consumption, max.	30	mA
Valid AS-Interface addresses	1 - 31	
<b>AS-Interface inputs</b>		
Switch actuated	Acc. to AS-Interface Safety at Work	
Switch open	D0 ... D3, code sequence	
	D0 ... D3, zero sequence	
<b>AS-Interface outputs (only CMS-R-AZA)</b>		
Output D1	LED, 1 = LED on	

## Safety switch CET-AS1 with guard locking and integrated evaluation electronics



Reliability values according to EN ISO 13849-1		Value		Unit
Parameter	Head downward or horizontal	Head upward		
Category	4	3		
Performance Level (PL)	e	e		
PFH <sub>d</sub>	$3.1 \times 10^{-9}$	$4.29 \times 10^{-8}$		
Mission time	20	20		years

Switch/evaluation electronics			
Parameter	Value		Unit
Material	Ramp	Stainless steel	
	Switch housing	Die-cast aluminum	
Installation position	Any (recommendation: switch head downward)		
Mechanical life	$1 \times 10^6$		
Ambient temperature	- 20 ... + 55		°C
Weight	Approx. 1		kg
Actuator approach speed, max.	20		m/min
Locking force max.	6500		N
Locking force $F_{zh}$ in accordance with test principles GS-ET-19	5000		N
Degrees of freedom X, Y, Z	$\pm 5$ mm		
<b>Guard locking solenoid</b>			
Solenoid operating voltage (auxiliary voltage on black AS-Interface cable)	24 V +10/-15% Power supply unit with electrical isolation (IEC 60742, PELV)		V DC
Current consumption	50		mA
Current consumption of solenoid $I_{CM}$	400		

AS-Interface connection		Value		Unit
Connection		Plug connector		
Version		M12 (4-pin)		
Degree of protection acc. to IEC 60529		IP 67 <sup>2)</sup>		
Rated insulation voltage $U_i$		50		V AC/DC
Switching principle		Slow-action switching contact 1 NC contact each $\ominus$		
EMC protection requirements		Acc. to EN 50295 (AS-Interface standard) and IEC 62026		
<b>AS-Interface data</b>				
Acc. to AS-Interface specification 2.1		EA code: 7	ID code: B	
Total current consumption, max.		30		mA
Valid AS-Interface addresses		1 - 31		
<b>AS-Interface inputs</b>				
Acc. to AS-Interface Safety at Work				
Door monitoring contact SK		D0, D1		
Solenoid monitoring contact UK		D2, D3		
<b>AS-Interface outputs</b>				
D0		Guard locking solenoid, 1 = solenoid energized		
D1		Red LED, 1 = LED on		
D2		Green LED, 1 = LED on		

2) Screwed tight with the related plug connector

## Safety Basis Monitor SBM



### Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
Category	4	
Performance Level (PL)	e	
PFFd	5.08 x 10 <sup>9</sup>	
Mission time	20	years

### SBM



Parameter	Value			Unit
	min.	typ.	max.	
Housing	Connecting strip housing			
Ambient temperature	0	-	+55	°C
Storage temperature	-25	-	+85	
Dimensions (H x W x D)	99 x 22.5 x 114			mm
Degree of protection acc. to IEC 60529	IP 20			
Connection	COMBICON plug			
AS-i voltage	18	-	31.6	V
Safety monitor	Safety Basis Monitor			
OSSD (Output Signal Switching Device)	2-channel			
Response time	< 40			ms
Inputs	4 safe inputs of Cat. 4 or 8 standard inputs and outputs			
Switching current at 24 V	static	4		mA
	dynamic (T = 100 µs)	30		
Connection conditions between the input terminals				
- Resistance	-	-	150	Ω
- Cable length	-	-	200	m
Outputs: 2 output switching elements				
Semiconductor outputs (output circuits 1 and 2)				
Contact capacity DC13 at 24 V	-	-	700	mA
AS-i current consumption	-	-	200	
AUX voltage (PELV)	20	-	30	V
AUX current consumption	-	-	4	A
AS-i/AUX insulation voltage	-	500	-	V
Input supply voltage	From 24V auxiliary power			
Output supply voltage	From 24V auxiliary power			
Output current for monitoring outputs (per output)	-	-	10	mA
Output current for OSSD supply	-	1.4	-	A
Test pulse when output is switched on				
- Interval between 2 test pulses	250	-	-	ms
Pulse length up to	-	1	-	ms
<b>Display elements and switches</b>				
4 x LED yellow (S1, S2, S3, S4)	State of inputs S1, S2, S3, S4			
4 x LED yellow (S5, S6, S7, S8)	State of inputs S5, S6, S7, S8			
LED green/yellow/red (SM)	State of safety monitor			
LED green/yellow/red (AS-i M)	State of AS-i master			
LED green/yellow/red (O1)	Output 1 has switched			
LED green/yellow/red (O2)	Output 2 has switched			
Button	1 x service			
Applicable standards	EN 954-1 Cat. 4, IEC 61508 SIL 3, EN IEC 62061 SIL 3 EN 13849-1 2006/PL e			

## Safety monitors SFM



### Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
Category	4	
Performance Level (PL)	e	
PFH <sub>d</sub>	9.1 x 10 <sup>9</sup>	
Mission time	20	years

### SFM-A01, SFM-A02, SFM-B02, SFM-C12



Parameter	Value	Unit
Housing material	PA6.6 plastic	
Dimensions	45 x 105 x 120	mm
Weight	Approx. 0.35	kg
Operating temperature	- 20 ... + 60	°C
Storage temperature	- 30 ... + 70	°C
Mounting	35 mm DIN rail acc. to DIN EN 50022-35	
Operating voltage U <sub>b</sub>	24+15%/-15% Power supply unit with electrical isolation (IEC 60742, PELV)	V DC
Residual ripple	< 15 %	
Rated operating current	SFM...1: 150   SFM...2: 200	mA
Response time	< 40	ms
Switch-on delay	< 10	s
<b>Connection</b>		
Connection	Plug-in screw terminals	
Connection terminals	0.14 ... 2.5	mm <sup>2</sup>
Degree of protection acc. to EN 60529	IP 20	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard)	
<b>Inputs</b>		
Start	Optocoupler input, active high PNP transistor output, 200 mA, short-circuit and reverse polarity protection	
Feedback loop	Optocoupler input, active high Input current approx. 10 mA at 24 V DC	
<b>Outputs</b>		
Monitoring outputs	4 door monitoring outputs PNP transistor output, 200 mA, short-circuit and reverse polarity protection	
OSSDs (Output Signal Switching Devices)	2 relay outputs	
Max. contact load	1 A DC-13 at 24 V DC / 3 A AC-15 at 230 V AC	
Continuous thermal current	3 A per output circuit	
External fuse, max.	4 A medium slow-blow	
Overvoltage category	3 for rated operating voltage, 300 V AC according to VDE 0110 Part 1	
<b>AS-Interface data</b>		
Acc. to AS-Interface specification 3.2	EA code: 7   ID code: B	
Operating voltage AS-Interface	18.5 ... 31.6	V
Total current consumption, max.	45	mA

## Terminal assignment

### SFM-A01

1.13					
⊗	⊗	⊗	⊗	⊗	⊗
⊗	⊗	⊗	⊗	⊗	⊗
+	-				
AS-		1.Y2			
-----					
L+	M				
⊗	⊗	⊗	⊗	⊗	⊗
⊗	⊗	⊗	⊗	⊗	⊗
1.14	1.24	FE			

- AS-Interface + ▶ Connection to AS-Interface bus
- AS-Interface - ▶ Connection to AS-Interface bus
- L + ▶ 24 V DC
- M ▶ GND / reference ground
- FE ▶ Function earth
- 1.Y1 ▶ EDM / feedback loop
- 1.Y2 ▶ Start input
- 1.13 ▶ Safety output 1.13
- 1.14 ▶ Safety output 1.14
- 1.23 ▶ Safety output 1.23
- 1.24 ▶ Safety output 1.24
- 1.32 ▶ Monitoring output

### SFM-A02 SFM-B02

1.13					
⊗	⊗	⊗	⊗	⊗	⊗
⊗	⊗	⊗	⊗	⊗	⊗
+	-				
AS-		1.Y2		2.Y2	
-----					
L+	M				
⊗	⊗	⊗	⊗	⊗	⊗
⊗	⊗	⊗	⊗	⊗	⊗
1.14	1.24	FE	2.14	2.24	

- AS-Interface + ▶ Connection to AS-Interface bus
- AS-Interface - ▶ Connection to AS-Interface bus
- L + ▶ 24 V DC
- M ▶ GND / reference ground
- FE ▶ Function earth
- 1.Y1 ▶ EDM / feedback loop 1
- 1.Y2 ▶ Start input 1
- 1.13 ▶ Safety output 1.13
- 1.14 ▶ Safety output 1.14
- 1.23 ▶ Safety output 1.23
- 1.24 ▶ Safety output 1.24
- 1.32 ▶ Monitoring output 1
- 2.Y1 ▶ EDM / feedback loop 2
- 2.Y2 ▶ Start input 2
- 2.13 ▶ Safety output 2.13
- 2.14 ▶ Safety output 2.14
- 2.23 ▶ Safety output 2.23
- 2.24 ▶ Safety output 2.24
- 2.32 ▶ Monitoring output 2

## AS-Interface Safety at Work safe output SOM



### Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
Category	4	
Performance Level (PL)	e	
PFH <sub>d</sub>	3.2 x 10 <sup>8</sup>	
Mission time	20	years

### SOM



Parameter	Value	Unit
Housing material	PA6.6 plastic	
Dimensions	22.5 x 105 x 114	mm
Weight	Approx. 0.2	kg
Operating temperature	0 ... + 55	°C
Storage temperature	- 25 ... + 85	°C
Mounting	35 mm DIN rail acc. to DIN EN 50022-35	
Supply current for sensors	100	mA
Insulation voltage	≥ 6	kV
<b>Connection</b>		
Connection	Plug-in screw terminals	
Connection terminals	0.14 ... 2.5	mm <sup>2</sup>
Degree of protection acc. to EN 60529	IP 20	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard)	
Inputs	2 conventional + 2 EDM	
Outputs	Relay (2 redundant)	
<b>AS-Interface data</b>		
Acc. to AS-Interface specification 3.2	EA code: 7	ID code: F
Operating voltage AS-Interface	18.5 ... 31.6	V
Total current consumption, max.	45	mA



## Safety monitors GMOx



### Reliability values according to EN ISO 13849-1

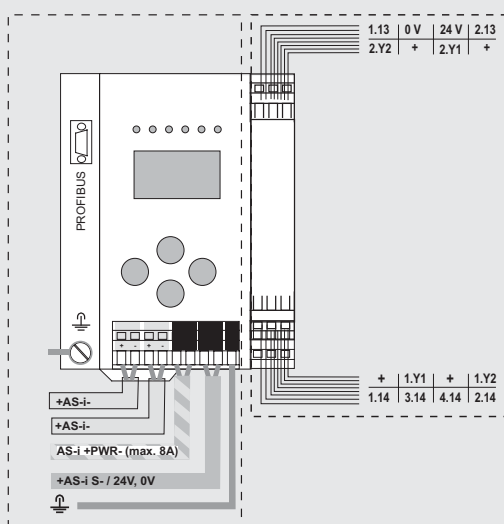
Parameter	Value	Unit
Category	4	
Performance Level (PL)	e	
PFHd	$5.36 \times 10^{-9}$	
Mission time	20	years

### GMOx



Parameter	Value	Unit
Housing material	Stainless steel	
Dimensions	120 x 96 x 100	mm
Weight	0.8	kg
Ambient temperature	0 ... + 55	°C
Permissible shock and vibration load	Acc. to EN 61131-2	
Operating voltage (AS-i voltage)	30	V DC
Operating current (from AS-i circuit)	300	mA
Insulation voltage	≥ 500	V
Standards	EN 61000-6-2, EN 61000-6-4, EN 62 061 (SIL 3), EN ISO 13849-1 (PL e)	
<b>Connection</b>		
Connection	Plug-in connection terminals	
Degree of protection acc. to EN 60529	IP 20	
<b>Display elements and switches</b>		
LC display	AS-i slave, error messages	
LEDs	8 (4 inputs, 4 outputs, AUX) 7 (power, PROFIBUS, config error, U AS-i, AS-i active, pgr enable, prj mode)	
Button	4	
<b>Profibus interface</b>		
Transfer rates	Acc. to EN 50170-3 9.6 ... 12000	
DP functions	Mapping of the AS-i slaves as I/O process data in the Profibus; complete diagnostics and configuration via PROFIBUS DP master	
<b>Safety monitor interface</b>		
Switch-on delay	< 10	s
Response delay	< 40	ms
Inputs	2 x EDM, 2 x start	
OSSDs (Output Signal Switching Devices)	2 relay contacts, 2 semiconductor	
Card slot	Memory card to store the configuration data	
Serial interface	RS232	

### Terminal assignment



## Bus coupling module BCM



### BCM-A-P2-SEM4-1

Parameter	Value	Unit
Housing material	Reinforced thermoplastic	
Degree of protection according to IEC 529 (mating connector inserted)	IP 67 on single insertion of the cable	
Ambient temperature	-20...+ 70	°C
Installation position	Any	
Weight	Approx. 30	g
Voltage max.	36	V DC
Current max.	4	A
AS-Interface to power insulation voltage	200	V
Mounting	Screw mounting (1 x M6)	
<b>Connection</b>		
AS-Interface and auxiliary power	Ribbon cable AS-i	
Line 1	AS-Interface bus ribbon cable (AS-Interface +, AS-Interface -)	
Line 2	Power ribbon cable (+24 V, 0 V)	
Safety switch	M12 socket	

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